Published every Saturday by the Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa., with editorial and executive offices: 30 Church Street, New York, N. Y., and 105 West Adams Street, Chicago, Ill.

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The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Subscriptions, including 52 regular weekly issues, payable in advance and postage free; United States and possessions, 1 year $6.00, 2 years $10.00; Canada, including duty, 1 year $8.00, 2 years $14.00; foreign countries, 1 year $8.00, 2 years $14.00.

Single copies, 25 cents each.

Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

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Competitive Transportation and Labor

General Johnson in his recent speech outlining proposed reforms in the NRA listed as one point in his program the "equalization of wages and hourly rates in competitive industries." Transportation industries that are directly competitive include railways, commercial carriers by highway, carriers by ocean, the Great Lakes and inland waterways, and carriers by air. To some extent the differences between the "wages and hourly rates" of these classes of competing carriers have been reduced by NRA codes which are applicable to other carriers but not to the railways. The codes for other carriers which General Johnson has thus far approved, however, provide for wages and working conditions which are much less favorable to their employees than the wages and working conditions enjoyed by railway employees. The result is to leave the labor costs which must be met by the railways relatively much higher than those that must be paid by their competitors. The railways are not trying to cause advances in the wages or hours of work of the employees of their competitors; but they recently did start a movement to secure reductions in the wages of their own employees, with which the government interfered.

Whatever should be done about railway wages, it would be difficult, if wages in industry are to be fixed by government, to make a valid argument against their "equalization in competitive industries," including the various competitive transportation industries. The railways were not included in the NRA, for the very good reason that they were already regulated to a much greater degree than provided for in the recovery act, and they were not, as were other industries, driving down living standards by competing with each other in reducing the wages of their labor. They were, however, being subjected to competition by other agencies of transportation which were reducing the wages and lengthening the hours of their labor, which helped them to win traffic away from the railroads, and thus throw railway employees out of work.

Railway and Truck Wages

The NRA could have ended this particular kind of competition in the transportation business, as it did in many other industries, if it had taken cognizance of railway wages and working conditions in its preparation of schedules of minimum wages in the codes for railway competitors. Instead, it insisted that all truck operators be brought under one code, although it is plain that over-the-road trucking is not competitive with local drayage, whereas it does compete with the railroads. The NRA then proceeded to approve wage minima for trucking as a whole which would be sufficiently low not to work a hardship on local drayage, but which, in being established at this level, would leave a comfortable margin below railway wage levels to enable trucks to get intercity business, not by any greater true economy of their service, but largely because of their low wages. Established for the purpose of equalizing competitive conditions, the NRA has equalized them between non-competing branches of the trucking business, while deliberately permitting lower wages in one branch of transportation than in a directly competing branch—the very negation of the spirit of the recovery act.

The lowest paid freight service transportation employees on the railroads are brakemen, and the present wage of such employees is $4.68 per 100 miles or eight hours, which is 58½ cents an hour at the very least, or almost 100 per cent more than the minimum of 30 cents per hour provided in the trucking code. But that is not all—if a truck is operated at relatively high speed, the hourly earnings of the driver do not increase as do those of the freight trainman. In the case of a freight train operating at 20 m.p.h. the brakeman's hourly earnings would rise to 93 3-5 cents, whereas the truck driver's pay would not increase above 30 cents. This comparison is a great deal more than fair to the truck operators, because the exacting work of a truck driver is more nearly comparable with that of a locomotive engineman than with that of a brakeman, and the locomotive engineman's wage rate is much higher than that of a brakeman.

Labor Leaders and Transportation Labor Costs

Nor does the truck code stop merely with hourly rates in permitting competition with the railroads at the expense of labor. Truck drivers, according to the code, may be "deadheaded" on trucks fitted with sleeping compartments without being paid for the time when they are not actually at the wheel. By contrast, railroad employees receive full time wages for all the "deadheading" they are required to do. The numerous schedule agreements in train and engine service where-

by employees receive additional pay for a wide variety of exigencies which may arise in connection with their work are, of course, entirely absent from the trucking code.

The railway labor leaders appear to have little realization of the kind of competition the railways are up against because of the low wage minima of their principal competitors—the motor trucks. They go busily about framing legislation to require large pension payments to their members and otherwise to increase the railways' labor costs, while ignoring the fact that the competition of low paid labor in other forms of transportation is a constant threat, not only to present railway labor standards, but to railway jobs as well. As the country sank into the depression, employers of labor who strove to maintain fair wages found that their prices and business were undermined by competitors who did not scruple to cut wages again and again. In the end the employers who paid fair wages found themselves faced with the necessity either of reducing labor costs to meet the level of their competitors or closing up shop and dismissing their employees. That is the situation which still confronts the railways, and yet nobody either in the government or among the leaders of railway labor seems to understand the situation or be in the slightest degree disturbed by it.

Arbitrary Rules That Injure Railway Labor

Whether truck wages should be leveled upward or those of comparable railway employees downward, there certainly never should be applied in truck transport some of the uneconomical working rules in effect in railway train service. Instead, such rules should be modified or abolished on the railroads. For instance —a typical case—there is a shipper of an occasional carload or two of cattle located at a station four miles from a railroad division point. This shipper wished to load his stock late in the day and catch a "hot shot" overnight train to the early morning market. The railroad explained to the shipper that it could not stop its fast train for such local work and maintain the schedule. The shipper then suggested that the railroad send the switch engine and its crew (idle a considerable portion of the time, anyhow) down four miles from the division point and pick up his shipment, placing it in the fast train at the division point. This, however, the railroad could not afford to do, since a line movement of this kind—only eight miles —would, under the rules, involve an extra day's pay for an entire engine and train crew. The result is, of course, that the stock is moving to market by truck.

The earnings of most railroad men fortunate enough to have jobs are reduced, not increased, by such rules. In all probability, business has been driven away from the rails in sufficient volume by such arbitrary inelasticity in working rules that, if it could be regained, it would permit the operation of one or two more trains daily over many railroad divisions, with a consequent increase in the employment of train and enginemen. And more trains would mean not only more men in train service, but more also in the shops, in the offices and on the section gangs. Arbitrary train service rules, not really needed for the protection of the employees, thus work to the disadvantage not only of train and enginemen, but of all classes of railroad employees, and all employees ought to be interested in modifying and simplifying them to whatever extent may be necessary to bring an increase in railway traffic without working a hardship on anyone.

More Railway Earnings Railway Labor's Real Need

The *Railway Age* has said many times that the railroad industry must reorient itself to present circumstances, which are entirely different from those under which most railroad men received their training. This applies no less to railway labor than to railway management. The time was when the principal task of railway management was to find the equipment to handle the traffic that was offered and move it with sufficient speed to satisfy the patrons and with enough efficiency to pay wages to labor and earn a profit for the stockholders. In those days the increase in gross revenues took care of itself automatically and labor's strategy was directed, from a selfish standpoint, quite effectively to getting as large a proportion of those revenues as possible.

Nowadays, however, the situation has changed entirely. The management's problem is not one of finding facilities for the traffic, but rather that of finding traffic for the facilities. Similarly, the true advantage of labor now lies, not primarily in securing a greater percentage of railway revenues, but in seeing those revenues increased to a point where labor's share of them, regardless of whether it be 40 per cent or 60 per cent, will be at least a sufficient sum to provide a decent living for the great body of railway workers —including those now unemployed. After all, 40 per cent of six billion dollars annual railway gross earnings is a much larger sum than 60 per cent of half that amount.

If labor leadership would devote its energies toward ending the competitive disadvantages which are keeping railway traffic and earnings at a low level—including arbitrary rules which inflate railway expenses by compelling the railways to pay large amounts of wages for work that actually is not done—it could greatly increase the money in the pockets of railway labor in the course of a few years. On the other hand, a labor leadership which concerns itself with increasing the disparity of labor costs between the railways and their competitors, which would cause further losses of traffic and a further decline in railway employment, is working directly to the detriment of its members and to the advantage of other carriers. It is not only unequal regulation and unequal taxation which have enabled trucks to take railroad traffic, but unequal wages and indefensible working rules as well.

View in Red Canyon, Looking West at Burns

Dotsero Cutoff Will Provide New And Shorter Traffic Route

Denver & Rio Grande Western is completing line on much-sought-for location through Colorado to bring Pacific Coast points nearer to Denver

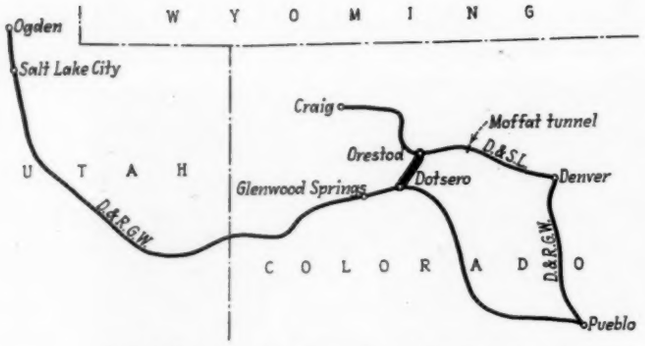
AS the only new-line project of major importance at present in progress in North America, the Dotsero cutoff, now under construction by the Denver & Rio Grande Western, occupies a unique position. However, the new line is of interest for other reasons. Its purpose is to provide, in conjunction with two established railways, a new and shorter route for traffic between Denver, Colo., and Salt Lake City, Utah, as well as to and from Pacific Coast points.

Few practicable routes are available for railways through the Colorado Rockies, and those that are require either long detours or costly work and heavy gradients. As a matter of fact in this section the Colorado river affords the only practicable approach to the Continental divide from the west. On the east, the valley of the Arkansas provides the most favorable approach, with respect to gradients and cost of construction.

The Denver & Rio Grande Western occupies the valley of the Colorado river, which contracts at places into deep, narrow canyons, from Westwater, Colo., through Grand Junction to Dotsero. From the latter point it ascends the Eagle river, with heavy gradients, to Tennessee pass, where it crosses the Continental divide and follows the Arkansas river to Pueblo, 120 miles almost directly south of Denver, from which point the line turns north to Denver.

Leaving the main line of the D. & R. G. W. at Dotsero, the new cutoff continues up the Colorado to Orestod, 38.1 miles, where it connects with the Denver & Salt Lake, formerly better known as the Moffat road. The plan under which it is being constructed provides that the D. & R. G. W. will operate its trains over the D. & S. L. from Denver to Orestod, 129 miles, thence over the cutoff to Dotsero, a total distance of 167 miles, as compared with 342 miles by the present route, making a reduction of 175 miles. Through this routing, not only will the distance to Salt Lake City be reduced by this amount, but the same reduction will extend to Pacific Coast points reached through the Salt Lake and Ogden gateways. It is estimated that this reduction in distance will be accompanied by a saving of about eight hours in the running time of freight trains between Dotsero and

Southern Entrance to Red Canyon



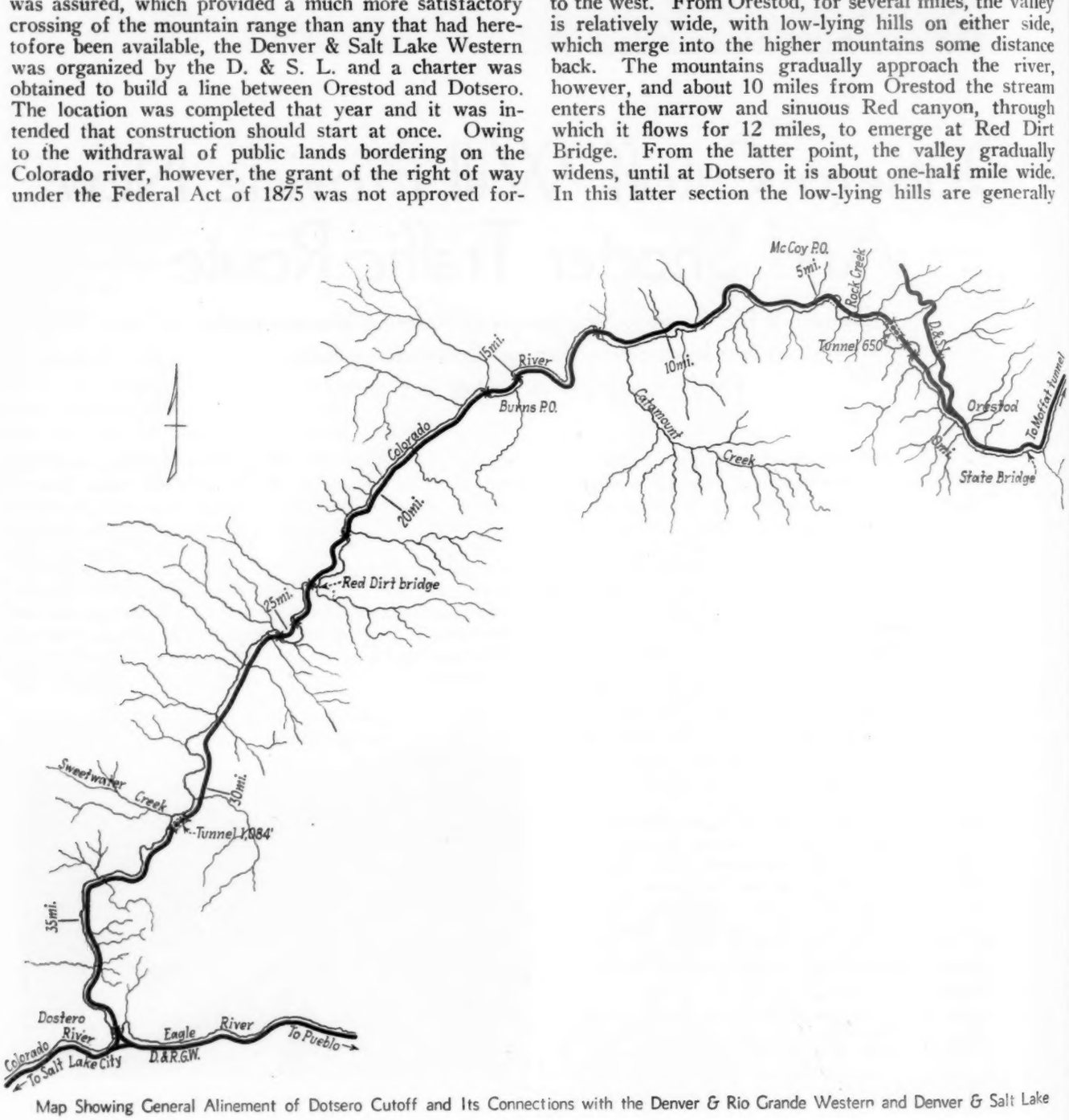
Sketch Showing New Route Over Dotsero Cutoff

Denver. It will not, however, affect traffic moving through Pueblo.

In 1924, after the construction of the Moffat tunnel was assured, which provided a much more satisfactory crossing of the mountain range than any that had heretofore been available, the Denver & Salt Lake Western was organized by the D. & S. L. and a charter was obtained to build a line between Orestod and Dotsero. The location was completed that year and it was intended that construction should start at once. Owing to the withdrawal of public lands bordering on the Colorado river, however, the grant of the right of way under the Federal Act of 1875 was not approved formally by the Secretary of the Interior until 1927. Since then, through agreement between the D. & R. G. W., the D. & S. L. and the Reconstruction Finance Corporation, the charter of the D. & S. L. W. came into the possession of the former, which was authorized to construct and have exclusive use of the line. The approval of this agreement by the Interstate Commerce Commission stipulated that construction should start by February 15, 1932, and be completed by November 15, 1934. Work was begun on November 11, 1932, and the grading was completed on November 15, 1933. It is expected that the line will be ready for operation by June, 1934.

Character of Country Traversed

From Orestod the Colorado river flows generally west for about 14 miles. In the next 10 miles it bends gradually toward the south and at Dotsero flows nearly south, but at the mouth of the Eagle river it turns again sharply to the west. From Orestod, for several miles, the valley is relatively wide, with low-lying hills on either side, which merge into the higher mountains some distance back. The mountains gradually approach the river, however, and about 10 miles from Orestod the stream enters the narrow and sinuous Red canyon, through which it flows for 12 miles, to emerge at Red Dirt Bridge. From the latter point, the valley gradually widens, until at Dotsero it is about one-half mile wide. In this latter section the low-lying hills are generally



Map Showing General Alinement of Dotsero Cutoff and Its Connections with the Denver & Rio Grande Western and Denver & Salt Lake

In Red Canyon about Two Miles East of Burns. Here the Track Rises to 60 Ft. above the River

absent, the valley being enclosed for the most part by high mountains with steep slopes.

Despite the rough character of the country, the fall of the river is relatively slight, the difference in elevation between Orestod and Dotsero being only 566 ft., an average of 13.5 ft. to the mile for the river and slightly less than 15 ft. to the mile by the located line. It was thus possible to secure a maximum gradient against eastbound traffic of only 26 ft. to the mile, except for a short 0.7 per cent gradient approaching the Sweetwater tunnel, about 7 miles north of Dotsero. Westbound, there is only one short adverse gradient and this is only 0.3 per cent. This compares with adverse gradients of 1.25 and 1 per cent eastbound and westbound, respectively, between Dotsero and Grand Junction. On the D. & S. L. there is an almost continuous adverse gradient westbound of 2 per cent between Denver and the east portal of the Moffat tunnel and a ruling gradient eastbound of 2 per cent between Tabernash, 63 miles east of Orestod, and the west portal.

Characteristics of Line

In alinement, conditions on the cutoff were far less favorable. As already mentioned, the valley is narrow and winding. In many places, particularly in Red canyon, the location was fixed within narrow limits and about the only latitude allowed the locating engineer was that of making refinements to reduce curvature. Even this was not always possible, however. As an example, at one point where the river makes a wide sweep, changing its direction about 120 deg., a 6-deg. curve had been introduced into the original location. Later, in an effort to improve the alinement, it was found that a change of as little as 10 min. either way would have increased construction costs beyond all reason.

In the original location, curvature up to 10 deg. had been introduced freely, and the total central angle aggregated 6,758 deg., or an average of 164 deg. to the mile. In part, this was done to avoid river crossings, of which only two, including one over the Eagle river at Dotsero, were contemplated, and tunnels, the plan at that time providing for only one tunnel 400 ft. long.

While matters relating to the tripartite agreement already referred to were pending before the Interstate Commerce Commission, locating parties were put into the field by the D. & R. G. W., with a view of reducing the curvature to a maximum of 6 deg., and eliminating as much central angle as practicable. As a result of the refinements thus developed, maximum curvature of 6 deg. was obtained, except for one temporary curve of 7 deg. 30 min., and many other curves were lightened; the total central angle was reduced by 2,558 deg. to 4,200 deg., an average of 112 deg. to the mile; and the line was shortened from 41.4 miles to 38.1 miles.

To accomplish these refinements in curvature and alinement, it became necessary to increase the river crossings to 10 and the number of tunnels to 2. It is at the location of a deferred 1,500-ft. tunnel that the temporary 7-deg. 30-min. curve was used. In increasing the number of bridges, the aggregate length of steel spans was increased from 340 to 2,390 ft., and the structural steel from 400 to 2,000 tons, all steel bridges being of the deck plate girder type on concrete substructures.

As a basis for making these revisions, it was calculated that an expenditure, including interest at 5 per cent, of $2 could be justified for every foot of distance saved, and of $26.67 for each degree of central angle eliminated, per million gross tons of traffic. The governing influence, however, was the necessity for a high speed and shortest practicable line which entirely warranted the reduction in distance of 3.3 miles and elimination of 2,558 deg. of central angle.

The Line Described

Starting from Dotsero, the line crosses the Eagle river by means of a three-span steel bridge over a channel diversion which was necessary to bring the crossing beyond the wye. For the first seven miles the line lies in the wide section of the valley, but because of the sinuous channel of the river and the fact that in many places the floor of the valley is low, the location was chosen to obtain support upon the higher part of the valley floor or upon the slopes on the east side.

Opposite the mouth of Sweetwater creek, seven miles

A Typical Colorado River Bridge

Looking West Near Orestod toward Upper Tunnel

above Dotsero, a high and relatively wide spur of hard, black shale overlaid with sandstone extends to the river. This spur is pierced by a tunnel 1,084 ft. long, the first 200 ft. of which is through packed dry sand. The remainder is through the shale and fissured sandstone, which has a decided dip to the north. This, together with the fact that the strata are deeply but distinctly bedded, made it impossible to avoid unusually heavy overbreak.

The tunnel is lined throughout with concrete. The mixing plant was located at the south portal and the concrete was transported by motor trucks. At the point of delivery it was elevated and chuted into the forms, the progress being about 48 ft. a day when depositing concrete. To avoid an excessive use of concrete, the cavities caused by overbreak back of the side walls and over the haunches and arch ring were filled with well-compacted sand and gravel.

North of Sweetwater tunnel the floor of the valley is consistently high, and the line keeps well away from the side hills. At first no rock is encountered and the grading is relatively light, but as the valley narrows, rock is encountered more frequently and the volume of grading increases. The first Colorado River bridge is encountered 13 miles above Dotsero at a point where an elongated loop in the river requires two crossings within a few hundred feet.

From this point the valley narrows rapidly, and shortly after crossing the river again about two miles further up stream, the line enters Red canyon, which it occupies for 12 miles. For the first five miles this canyon is a narrow, winding gorge with high, precipitous sides which often approach the vertical. Here the mountains close in and only a short distance back reach elevations of three to four thousand feet above the river. In this section the alinement is severe, being in places almost a continuous succession of curves, with central angles up to 157 deg. Because of the many abrupt changes in direction, it was frequently necessary to resort to the maximum of 6 deg. curvature.

For the remaining seven miles the canyon approaches more nearly the typical canyon formation with sloping sides and a slightly greater width at the river level. In places the sides recede perceptibly, allowing a somewhat greater latitude in location and consequently an easier alinement. In this section of the canyon the river is crossed three times for the purpose of obtaining a more satisfactory alinement, and in one place, near Burns, the roadbed ascends to an elevation about 60 ft. above the river to avoid the excessive amount of grading that otherwise would have been necessary. As the east end of the canyon is approached, the river itself widens, but the steep canyon walls, although gradually decreasing in height, rise from the water's edge. Here it was necessary for the roadbed, which is about 18 to 20 ft. above normal water level, to encroach upon the channel. By again crossing to the right bank of the river a short distance below the mouth of Catamount creek, better support was obtained and the line continues on this side to Orestod, except for a short space where a river loop required two more crossings.

Emerging from the canyon, the line enters a gradually widening and less abruptly devious valley with considerable bottom land, and presents conditions that were favorable for better alinement. About three miles below Orestod, however, a relatively high and wide ridge, composed of gravel and sandstone, extends almost completely across the valley. To avoid a wide detour around the end of this spur, as well as other undesirable features of the alternate location, a 650-ft. tunnel was drifted through the ridge. Immediately beyond the tunnel, a second wide loop in the channel required the construction of two more river bridges about a half mile apart.

In an effort to obtain as much tangent as practicable between Red canyon and Orestod, the located line crossed or encroached upon the river channel at numerous places. To avoid the construction of bridges, as well as to remove the danger of erosion of the embankment at the points of encroachment, many channel changes were made in this section. In most cases it was possible to do this at practically no additional cost, since the new-channel excavation was suitable for embankment material, most of which had to be borrowed in the sections across the river bottom. In two instances, however, the new channels were excavated through rock, since otherwise it would have been necessary to introduce curvature heavier than 6 deg. or to construct four additional bridges, the latter alternative being about as expensive as the channel change, while the angle of the crossings would have been objectionable. In one case, at least, the amount of rock excavation required for the roadbed, if neither alternative had been adopted, would have equalled that required by the channel change.

Roadbed and Track

Embankments for single track are not less than 20 ft. wide. Cuts are 24 ft. wide at subgrade level, with 3-ft. side ditches, giving a roadbed width of 18 ft., these minimum dimensions being required in all materials. Embankments composed of earth, gravel, shale or mixed material have side slopes of 1½:1, while those formed of excavated rock are 1¼:1. Cuts through solid rock have side slopes of ¼:1; those through loose rock are ½:1; where the material is earth mixed with loose rock the slopes are ¾:1, and slopes through earth and mixed materials not containing loose rock are 1:1.

Embankments were constructed in horizontal layers from 2 to 4 ft. thick, depending on the character of the material. Shrinkage allowances ranged from 3 to 10 per cent, also depending on the material and the method of depositing it. No provision was made for compacting, other than the movement of the tractors and trucks engaged in haulage. Owing to the ease with which much of the material composing the valley floor may be eroded, unusual care was exercised to insure against erosion of the roadbed. The minimum width of berm allowed at

any point was 15 ft. along embankments and 3 ft. adjacent to right of way boundaries. At all points where the embankment is adjacent to the river channel, riprap has been used freely to avoid the danger of erosion.

Where embankments were located on slopes, steps were plowed or cut in the natural surface, and the contractor was required to lay a rough wall 2 to 3 ft. high, of coarse material or heavy stone as available, along the foot of the lower embankment slope to afford a footing for the remainder of the material. A further requirement was that the remainder of the coarse material from excavation or borrow be placed on the sides of the fill. To insure a firm foundation and thus avoid the possibility of excessive settlement or later deformation of embankments, where marshy ground was encountered all wet unstable material within the slope stakes was removed before the placing of the embankment material was started.

Equal care was exercised in locating and excavating borrow pits, particularly where the excavation extended below the grade of the roadbed. In all cases complete drainage was required. Borrow was not allowed adjacent to any stream unless the natural ground was above high water, and in this event the bottom of the borrow pit was not allowed to be lower than the elevation of high water. Where practicable, borrow was obtained by widening cuts, but in many instances this practice was affected to some extent by the overhaul provisions of the contract.

All roadbed, except where sidings are provided for, is graded for single track. The track is being laid with 90-lb. rail, on No. 5 creosoted ties and is fully tie plated with heavy bevelled plates 8 in. by 11⅛ in. in size. Not less than three inches of locomotive cinders is being applied as ballast directly on the subgrade of the roadbed and overlaid with a minimum of four inches of a uniform grade of rather fine pit-run gravel and then topped with five inches of very coarse and hard gravel crushed to a maximum size of 1½ in.

All curves are simple curves, spiraled with Searles' spiral, 300 ft. long for a 6-deg. curve and for lighter curves in proportion. Not less than 300 ft. of tangent was required between adjacent points of spiral on curves of opposite direction, and this requirement was enforced even in Red canyon, where most of the curvature predominates.

Drainage and Waterways Were Important

A moderate amount of snow falls normally in the immediate territory traversed by the cutoff. Heavy accumulations of snow are common, however, in the mountains around the headwaters of the Colorado. As a result, the runoff from the melting snow, augmented by spring rains, assures the annual recurrence of high water. Although the drainage area above Orestod is large and several important tributaries flow into the river, flood stage at this point is only about nine feet above normal flow. Below Orestod, despite the numerous tributaries, the fall in the river is sufficient to restrict the fluctuations between high and low water to eight feet as far as Dotsero.

For this reason, the bridging of the Colorado presented no special problem. In this connection it should be borne in mind that the Colorado, in common with other mountain streams, is able to pass a very large volume of water through a relatively narrow channel. To insure against any contingencies that can be foreseen, all bridges across the river have been placed at elevations that will enable them to handle flood stages considerably higher than any so far known.

By reason of the relatively narrow channel, the moderate increase in width with progress down stream, and the substantially uniform conditions at these crossings, it was found desirable to standardize the design of the superstructures. All of these bridges, nine over the Colorado and one over the Eagle, consist of three deck-girder spans, the center span being 120 ft., and the approach spans either 50 to 75 ft., depending on the angle of the crossing. Ballast decks have been provided for all bridges located on curves; those on tangent have open decks.

As compared with the relative simplicity of the waterway problem with respect to the main stream, that of side drainage and the provision for waterways over tributary streams was a matter of prime importance which required thorough and detailed study. Contrasted with the moderate winter precipitation, during the summer months this section of Colorado is subject to sudden and violent rainstorms, which often reach the proportions of cloudbursts. Owing to the steep slopes of the mountains, the runoff takes place very quickly. In fact, often there is no appreciable interval between the breaking of the storm and the time when the first of the runoff water appears in the channel of the streams that provide the drainage for the area affected by the storm. Likewise, the period of maximum runoff may very nearly coincide with that of maximum rainfall. It is not uncommon, therefore, for these streams to change within a few moments into raging torrents.

In addition to the 20 major tributary drainage channels that are crossed, there are almost innumerable minor streams and small gulches, dry except at times of local precipitation. Many of these latter are real problems, owing to the large volume of debris they wash down to clog the waterway openings through the embankment. Creosoted-timber, ballast-deck pile trestles were constructed at the 20 major side streams, and corrugated metal pipe, ranging from 12 to 84 in. in diameter, was installed at the remainder of the waterways.

Construction Equipment and Methods

No rail equipment was employed at any point during the construction of the roadbed, all grading and hauling operations being motorized. Twelve shovels were employed, all on crawler mountings, two of these machines

Diesel-Powered Shovel Loading into a 5-Yd. Motor Truck

Rock Cut at Red Dirt Bridge, Showing Tilting of Strata

being steam shovels. The remainder were powered with gasoline or Diesel engines. Owing to the topography, practically all excavation was accomplished with sturdy machines equipped with dippers having a capacity of 1¾ cu. yd. Over the entire job, the excavated material was transported in 5-yd. motor trucks, except at one point where four 9-yd. trucks, brought from the Boulder dam, were in use, while on a few of the lighter sections where the 5-yd. dump trucks were not suitable, 3-yd. trucks were used. As an indication of the amount of work that was done with the speedy equipment employed on this project, one of the gas-driven shovels equipped with a 1¾-cu. yd. dipper excavated and loaded into 5-yd. trucks, 3,245 cu. yd. of earth during one 8-hr. night shift, and others made comparable records. All outfits worked two shifts of 8 hr. each.

Owing to the widely varying conditions encountered in disposal of excavation, provision was made in the specifications for overhaul. This clause provided for 500 ft. of free haul and payment for hauls beyond this limit on a station-yard basis.

Transportation of construction materials and supplies was a major problem in itself, particularly as there were few roads. Those that were available were unsurfaced and in poor condition, some being but little better than trails, with steep grades and sharp winding turns. Access to the right of way was often difficult. Since highway conditions did not permit these deliveries to be made at Dotsero, Gypsum, eight miles to the east, was chosen as the supply point and all materials and supplies, except track material and structural steel, were hauled by motor trucks from that station.

Culvert pipe, cement, concrete aggregates, steel reinforcement, and foundation piles were furnished by the company and hauled by the contractor on a unit-mile (profile distance) basis. Falsework piling for the steel bridges was cut in adjacent forests and delivered at bridge sites. The prices for hauling included unloading from cars, storage where necessary, delivery to the point of use and the payment of demurrage in case the cars were not unloaded promptly.

Quantities Involved

Among the major items involved in the construction of this line were clearing, 300 acres; solid rock excavation, 800,000 cu. yd.; other grading, 2,650,000 cu. yd.; tunnel excavation, 32,000 cu. yd.; riprap, 45,000 cu. yd.; overhaul, 8,000,000 sta. yd.; concrete for bridge substructures, 5,000 cu. yd.; concrete for lining tunnels, 4,800 cu. yd.; culvert pipe, 17,000 lin. ft.; structural steel, 2,000 tons; foundation excavation, 5,190 cu. yd.; foundation piles, 1,600 lin. ft. Among the principal items involved in the delivery haulage of materials were cement, 400,000 cwt. miles; and culvert pipe, 360,611 lin.-ft. miles. The foregoing represents, however, only a small part of the total items involved in carrying out the project, as is illustrated by the fact that there were 87 separate items, including the classification of grading materials, for which unit prices were given.

Facilities and Operation

Since there are no towns or villages between Orestod and Dotsero, except a small settlement and post office at McCoy, about five miles west of Orestod and more than a mile away from the line, no stations will be established for the present. On the other hand, most of this territory is given over to grazing, and considerable stock is sent out from the numerous ranches along the river. To provide facilities for making shipments, pens and loading tracks will be located at two or three convenient points.

Orestod has been selected as a district terminal, with engine districts extending to Denver on the east and Grand Junction on the west. An engine terminal and yard will be established, in preparation for which a rectangular enginehouse, a wye for turning locomotives and a system of yard tracks are now under construction. The plans also include water and coaling facilities, a telegraph office, station accommodations and stock pens. Since there is no settlement at Orestod and, therefore, no living accommodations for employees and their families, the plans also include the necessary company dwellings, and rest facilities for train and engine crews whose runs terminate here.

Relocation and construction of the line, which, when completed, will cost approximately $3,850,000 has been carried out under the general direction of Arthur Ridgeway, chief engineer, with J. G. Gwyn, engineer in charge of all field operations. Mr. Gwyn and L. B. Furman were locating engineers, and were later construction engineer and resident engineer, respectively, on the construction work. O. K. Peck, engineer of bridges, designed the structures and superintended their erection. G. M. Darby, division engineer, is in charge of the track laying and ballasting. The Utah Construction Company, the W. A. Bechtel Company and the Morrison-Knudsen Company, members of the Six Companies which is constructing the Boulder dam, were, jointly, the general contractors, each company individually taking sub-contracts for certain sections of the line.

* * *

On the Pennsylvania at Alliance, Ohio

A Study of the Locomotive Front End by Means of Tests on a Model*

Effects of variations in the nozzle form, in stack diameter and taper, and in the height of the stack and of the nozzle each separately determined

THE problems of front-end performance are of such a nature that the practical limit of information which may be secured in service tests is that "this is a good (or otherwise) arrangement for the particular conditions encountered," information which is scarcely capable of being generalized. More definite information can only be secured under laboratory conditions of controlled variables: all conditions but one must be held constant and the effect of changes in this single variable may be investigated. The major contributions to knowledge of the action of the front end have been made by laboratory or standing tests of locomotives, or by tests on front-end models. Any test program involves the study of the performance of a number of types and sizes of nozzles, the height, taper, and flare of stacks, the location of the nozzle relative to the stack, the rate of steam discharge, and other variables to such a number that the investigation of even a limited phase of front-end performance on the full-sized locomotive involves heavy outlay.

Governed by these considerations, the Railway Engineering Department of the University of Illinois constructed a quarter-scale model which represented accurately (in its original condition) the front-end arrangement of the U. S. Railway Administration heavy Mikado type locomotive (the 2-8-2-B). The model was supplied with steam at controllable pressure, quality and superheat, from power-plant boilers. Air was drawn into the front end through a set of tubes and a firebox provided with a large gas burner, which made possible the use of air under atmospheric conditions, or if heated air plus a determinable mixture of products of combustion at any desired temperature. There were available, as modifications of the model, forty different nozzles, and ten stacks of varying diameter and taper which could be combined with various flares and extensions. Some four thousand tests were run on the model representing 350 different arrangements, with from four to seven different rates of steam discharge for each. A considerable number of arrangements were tested both with hot and cold air, and with both pulsating and steady flow of steam.

*The complete report of these tests appears in Bulletin 256 of the Engineering Experiment Station of the University of Illinois, entitled "A Study of the Locomotive Front End, Including Tests of a Front End Model," by Everett G. Young.

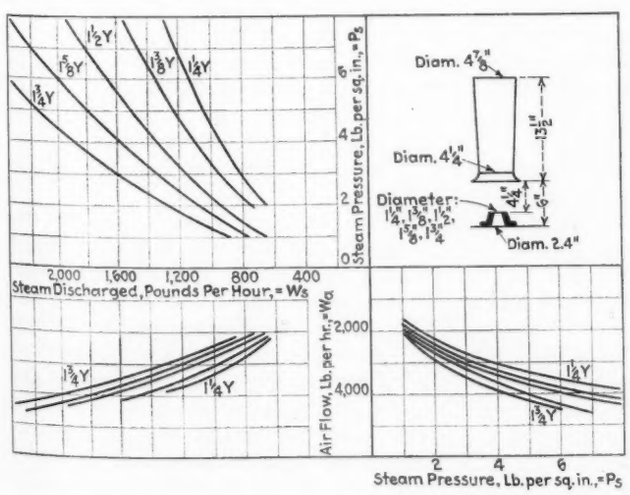


Fig. 1—Tests of Circular Nozzles with No. 1 Taper Stack

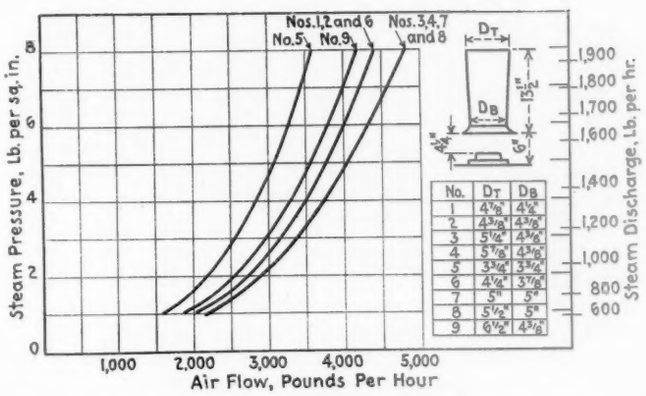


Fig. 2—Tests of Nine Stacks of Standard Height and Flare with 1½-in. Circular Nozzles (Separate curves not drawn for Nos. 2, 4, 6, 7 and 8)

Are Results with a Model Reliable?

Three major facts bearing on the data from the model were developed early in the investigation:

It was not to be expected that the model would give results which would serve to indicate quantitative conditions in an actual locomotive, but rather that the laws governing the effects of various changes in arrangement and operating conditions would be shown. However, it was found, by applying appropriate scale factors developed from hydrodynamic theory, that the performance of the model closely approximated that of a comparable locomotive. Moreover, the perfect correspondence of the model action with all of the known facts of front-end performance gave confidence that all of the qualitative results obtained from the model were fully applicable to the full-sized locomotive.

Repeated careful testing indicated that the discharge of a given weight of steam resulted in the movement of the same weight of air, whether the flow of steam was steady or pulsating, provided the pulsation rates were in excess of 100 per minute, corresponding to 25 revolutions of the driving wheels.

Comparison of test runs with the same front-end arrangement made with hot gas (at a fixed temperature) and cold air, respectively, showed consistent relations independent of the front end arrangement, and the order

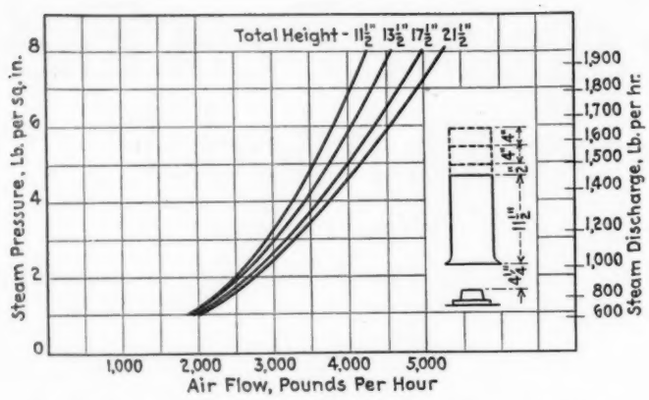


Fig. 3—Tests of Cylindrical Stack and Extensions with 1½-in. Circular Nozzles

of merit of various arrangements was the same whether hot gas or cold air was used. Consequently the cold-air tests gave reliable indications both as to the qualitative and quantitative results to be expected had hot gases been used.

During the progress of these tests, the general arrangement of the diaphragm, table plate, nozzle stand, deflector plate and netting of the Master Mechanics' front end were left unaltered, the changes in arrangement consisting of alterations in the form and size of the nozzle and the shape and position of the stack only. In Fig. 1 are shown the results of a series of tests with a group of plain round-opening nozzles, referred to as the Y-series, in combination with a tapered stack having a small bottom flare. The five nozzles varied from 1¼ in. to 1¾ in. in diameter. Neither the stack nor the nozzles were of the best forms found, but the middle nozzle of the series, combined with this stack, closely represented the prototype locomotive. It will be seen that each successively larger nozzle discharged a given flow of steam per hour at lower pressure, and moved a smaller amount of air per hour. This is a generalization of the well-understood condition which leads to the reduction of the nozzle area to improve the steaming (that is, improve the combustion or accelerate it by increasing the air available), at the expense of increased back pressure. It is also to be noted that the flow of steam is (for a given pressure) almost precisely proportional to the area of the nozzle, for a given form of opening.

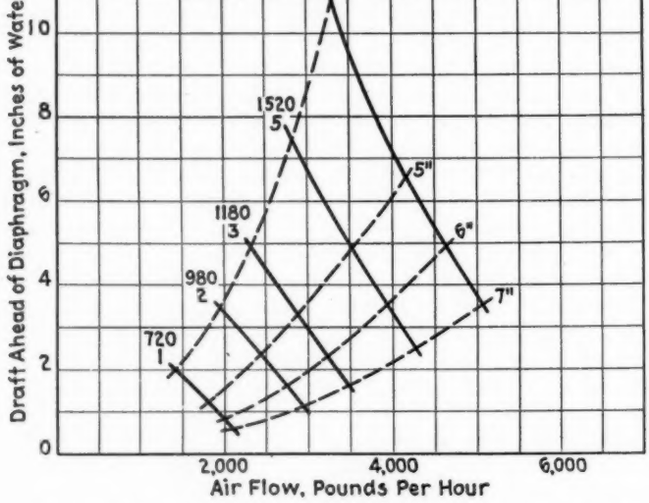


Fig. 4—Tests of Identical Front-End Arrangements and Variable Resistance Through the Model

Methods of Improving the Locomotive Front End

The results of improving a front-end arrangement are either the moving of the same amount of air with less steam or lower back pressure, or the movement of a greater amount with the same amount of steam, or the combination of the two, if inherently conflicting condition can be overcome. There are several methods of accomplishing such improvements.

Improvement of the Form of the Nozzle—Substantially equal results were obtained from all nozzles having plain, round openings of the same area, regardless of the taper of the channel through the nozzle. The use of square, rectangular or annular ring openings resulted in insignificant changes in performance. The use of incurving edges or hooks merely reduced the effective opening due to the eddy effects around the edges. Nozzles of the turbine type, flaring outward were detrimental. Bridging the nozzle, but maintaining the same area, and the use of internal projections as in the Goodfellow tip, gave definitely improved performance. The basket bridge type worked well with an adequate stack flare, but the best results were secured from nozzles with distinctly separate opening such as the "pepperbox" type. The best nozzles produced as much as 12 per cent increase in air flow over the standard round nozzle of the same area and with the same steam discharge, while certain poorer ones fell 50 per cent below.

Improvement in the Diameter and Taper of the Stack—Fig. 2 shows the range of performance in terms of air flow for a series of nine stacks, all having the same height and form of flare, and the same distance between the top of the nozzle and the bottom of the stack. Three stacks are cylindrical and six taper in various degrees as shown in the table in the chart. Two of the stacks show definitely poorer performance than stack No. 1; Nos. 2 and 6 are slightly inferior, and Nos. 3, 4, 7 and 8 are definitely superior, with No. 7 slightly the weakest of this group. The stacks giving superior performance are those with larger top diameter, and larger diameter both at the top and bottom. A taper of about 1 inch in 12 was found to give the best results with the plain nozzles, and in other tests it was proved that the increase in diameter could be placed entirely in the top half of the stack with equally good results.

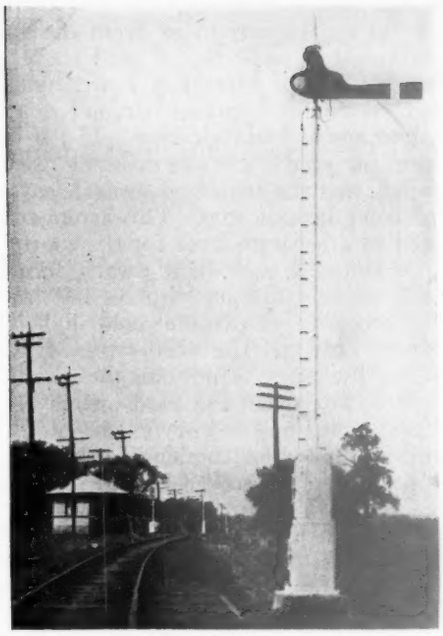
Addition to the Stack Height—With either straight or tapered stacks, the addition of outside extensions gave important improvement in performance. Fig. 3 shows a specific case in which the amount of air moved was increased more than 20 per cent due to the added height. This means of bettering performance is not usually available in practice, since most locomotives have stacks about as high as clearance will permit. The gain cannot be secured by lengthening the stack inside of the smoke box unless the nozzle may be lowered at the same time.

Changes in Height of the Nozzle—With the stack unchanged, a change in the height of the nozzle produced changes in performance as great as that resulting from an equal addition to the stack height. The distance between the top of the nozzle and the top of the stack is the most important dimension in the determination of front-end performance, unless the other dimensions and proportions are in very poor relation to each other. The lowering of the nozzle, with the Master Mechanics' front end, is accomplished at the cost of increased resistance under the table plate in most cases, and this increased

(*Continued on page 348*)

Automatic Plant Replaces Mechanical Interlocking on Alton & Southern

Yard lead-out switch, formerly in plant, now controlled from yardmaster's office—Saves 36 per cent on cost



Westward Home Signal on Alton & Southern

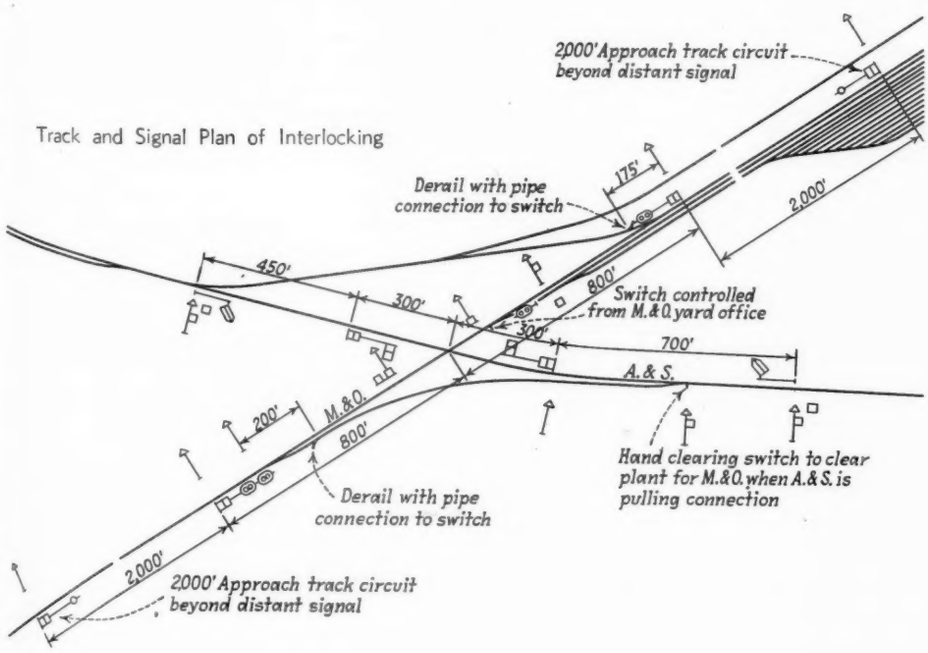
IN East St. Louis, Ill., the single-track main line of the Mobile & Ohio is crossed by a single-track main line of the Alton & Southern. A mechanical interlocking, with 14 working levers, was formerly in service at this crossing, and, in addition to the signals, operated a yard-lead switch on the M. & O., as well as derails on each of the four main-line tracks.

As it was not necessary to maintain a block office at this point for either road, a study was made to determine means of reducing operating expenses at this crossing. As Mobile & Ohio freight trains enter and leave the yard at the switch located about 65 ft. north of the crossing, it did not seem feasible at first to replace the mechanical plant with an automatic interlocking. However, on further study it was found that the operator in the M. & O. yardmaster's office always had information as to when freight trains were to arrive or depart. It then developed that it would be practicable to operate the yard-lead switch by a power machine, and to control it, together with the signals for train movements over the switch, by a lever located on the operator's desk in the yardmaster's office. With the control of the switch thus arranged, the mechanical plant was replaced by an automatic interlocking.

As the Mobile & Ohio operates through passenger, as well as freight trains, over this line, distant signals are 2,000 ft. from the home signals, while approach control sections extend 2,000 ft. beyond the distant signals. However, the Alton & Southern operates freight trains at low speeds only over this crossing, and it was satisfactory, therefore, to locate the distant signals on this line 450 ft. from the home signals and to use the intervening space as the approach control section for the interlocking.

The signals on the Alton & Southern are Style-B semaphores, and operate to two positions, while the distant signals, likewise semaphores, are fixed at the caution position. These signals are equipped with Style-D electric lamps, the distant signals having 10-volt, 0.25-amp. lamps burned constantly, while the home signals have 10-volt, 0.25-amp. lamps on approach control. The home signals on the Mobile & Ohio are two-unit color-light Style-R signals with 10-volt 18-watt lamps, while the distant signals are the two-unit color-light type with 10-volt 18-watt lamps. These signals are on approach control.

Track and Signal Plan of Interlocking



The control of the signals for through train movements over the crossing is arranged in the manner ordinarily employed for automatic interlockings. As mentioned previously, a single-unit lever is located in the yardmaster's office for the control of the M. & O. yard-lead switch and of the signals for directing train movements over this switch when reversed. When this lever is in its normal position, the main-line signals governing movements over the switch are controlled by circuits the same as for an automatic interlocker, but when this lever is in its reverse position the switch is

set for movements to or from the yard track. If the movement is to be to the yard track, the operator does not reverse the lever and switch until the approaching train is on the approach circuit; this prevents the outbound signal from clearing. If the movement is to be from the yard track, the operator reverses the lever and switch, and the outbound dwarf clears, the inbound signal being held at stop. This arrangement eliminates the need of a separate lever for the control of these signals.

A two-unit color-light dwarf, located at the fouling point on the turnout, displays red for Stop and yellow for Proceed. A two-unit color-light signal is used as a lower "arm" on the northward M. & O. home signal. When the plant is normal, the red unit in the arm is lighted, but when the yard switch is reversed and the plant is lined up for a movement into the yard, the yellow unit is lighted in combination with a red light in the upper arm. The control of these signals for movement in either direction over the switch is, of course, dependent on the occupancy of the approach circuit and home signal limits of the plant.

Except for the instances explained above, the control of the new layout is automatic. When the Alton & Southern is setting out or picking up cars on the interchange track south of the crossing, a part of the train is occupying the approach circuit and would, therefore, hold the crossing signals against the Mobile & Ohio, unless some special arrangements were provided. This condition is met by providing a push button located in a box on a post near the turnout switch, the instructions to the trainmen being that, when making such switching moves on the main line, they are to operate the push button to release the plant for an approaching M. & O. train. The function of this push button is to eliminate from the control, the track circuit in the approach on the Alton & Southern. This arrangement automatically returns to normal when the train leaves the track circuit.

Storage batteries on a-c. floating charge through Union rectifiers are used for the power supply for the control circuits, signals and the switch machine; for example, one set of 12 cells of Exide DMGO-9 is used for the operation of the switch machine and the two southward signals on the M. & O.

Results Effected

The Alton & Southern traffic over this crossing averages from 6 to 8 trains a day, while the Mobile & Ohio operates 4 passenger trains, from 6 to 8 freight trains, and 6 to 10 switching moves daily over the plant. So far as train operation is concerned, the automatic plant has given very satisfactory service. The changeover from the mechanical interlocking to the automatic arrangement, with the switch controlled remotely, cost about $15,850, and the annual saving in operating expense is $5,700.

This automatic interlocking plant was installed by Alton & Southern forces according to plans prepared by the Union Switch & Signal Company, which also supplied the signal equipment. The installation was handled under the jurisdiction of T. H. Pindell, general manager of the Alton & Southern, W. J. Nuebling, engineer of this road, being in direct charge of the construction.

ANTICIPATING THIS YEAR more passenger business from Florida to the North and West than has moved in any of the past several seasons, the Southern is now actively soliciting this traffic and in this connection has issued a folder showing new low fares which it is offering. The folder also solicits the automobilist's business by calling special attention to the recently-published reduction in charges for the transportation in expedited freight service of automobiles accompanying passengers.

Study of Locomotive Front End

(*Continued from page 346*)

resistance may cancel the benefit derived. Placing the nozzle in a recess below the table plate secures much less gain than is secured if the nozzle is not thus hooded.

Other Changes—Denoting the stack height by H and the distance between the top of the nozzle and the bottom of the stack F, it may be said that for a constant value of $H + F$, the best results were obtained with F approximately equal to the stack diameter, but an increase of F to double this amount made very little difference. Variations in the form of the stack flare gave surprisingly small differences in performance, the variation within the range of practical forms being less than 10 per cent. The best results were obtained from flares having quarter-circle cross-sections, which increased the stack area at the base from 45 to 70 per cent, the larger flares working best with larger values of F. There was a clear indication of the advantage of flares connecting with the body of the stack without an angle.

Changing Resistance to Gas Flow

All of the changes considered thus far are based on the condition of identical resistance through the firebox, flues and front end. In this case the draft produced could have been used as the criterion of performance in place of the flow of air, since a given draft corresponds to a definite flow of air. However, as soon as the resistance is altered, results in terms of draft and air flow respectively come into a different relationship, as shown in Fig. 4. In the model, the resistance was readily varied by changing the diameter of an orifice plate (referred to as the "choke") in the path of the entering air. The normal choke diameter was 6 in. For a given steam flow, as the choke diameter decreased (increasing the resistance) the air flow *decreased* and the draft *increased*, and successive variations in the choke opening resulted in greater differences in performance than were produced by any change in the front-end arrangement. If the resistance is variable, the draft variation gives entirely inadequate information as to the working of the front end.

In addition to the front-end-arrangement tests, a method was developed for the exploration of the jet of mixed steam and air, permitting the determination of the temperature, pressure and velocity at any point from the mouth of the nozzle to the top of the stack. These explorations made possible an estimate of the relation between the mixing and entraining processes in the working of the jet, and a fairly accurate determination of the distribution of energy in the jet. It was found that about 20 per cent of the kinetic energy of the steam entering the front end was lost as a result of contact and collision with the air, but that only about a fifth of this 20 per cent was usefully used in moving and ejecting the air. The temperature relations are such that it is evident that most of the steam emerged from the stack with its energy practically unimpaired.

The tests demonstrated among other things the importance of correct back-pressure gages and an understanding of their indications; the value of standing tests of locomotives as a means of studying front-end performance; the fact that no amount of front-end improvement will overcome excessive back-end resistance whether permanent or temporary; and the fact that, while the drawing in of insufficient air to obtain the required combustion is the commonest difficulty, it is probable that under many conditions of operation the front end draws too much air and therefore reduces boiler efficiency.

$457,750,000 for Supplies in 1933

Purchases 871 million under 1929, but show continued importance to business—Expenditures widely divided—Increased buying for repair

THE railroads of the United States purchased fuel and materials and supplies totaling $457,750,000, exclusive of equipment purchases, materials furnished by contractors and bills for heat, light, water and electric power, during 1933, according to reports for the twelve months, received from railroads earning 93.5 per cent of the railway operating revenues. This total is $871,000,000 less than was expended for supplies in 1929, $581,000,000 less than was spent in 1930 and $237,000,000 less than was spent in 1931. It is, however, a larger sum than was spent for materials consumed by any other privately-managed business and was made despite the fact that the railroads built less mileage last year than any year since before the Civil War, that they bought only 42 new locomotives and less than 2,000 new cars, that all of the railroads maintained drastic restrictions on expenditures and that 21,000 miles of railroad are in the hands of receivers. Because of a substantial recovery in buying since last June, the total exceeds by $12,000,000 the purchases in 1932 and marks the termination of a period during which the railroads spent $2,700,000,000 less for fuel and materials and sup-

Table I—Purchases of Fuel, Materials and Supplies by Class I Railways of the United States—1924 to 1933, Incl.

(000 Omitted)

	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924
Fuel	$179,150	$178,250	$244,500	$306,500	$364,392	$384,608	$438,821	$473,354	$459,465	$471,656
Forest products	41,185	52,200	76,250	134,600	157,551	160,794	175,729	186,291	170,305	180,872
Iron and steel products	112,685	100,550	202,100	329,700	437,840	397,544	432,604	507,302	419,255	365,610
Miscellaneous	124,730	114,000	172,150	267,700	369,752	328,395	348,774	392,085	343,018	324,917
Grand total	$457,750	$445,000	$695,000	$1,038,500	$1,329,535	$1,271,341	$1,395,928	$1,559,032	$1,392,043	$1,343,055
Per cent of operating revenue	14.6	14.1	16.8	20.2	21.8	20.8	22.8	24.4	22.7	22.7

Table II—Purchases of Materials and Supplies by Class I Roads of the United States—1933*

	1933	1932	1931	1930	1929
Fuel:					
Coal	$151,150,000[1]	$146,550,000	$204,000,000	$249,050,000	$296,371,000
Fuel oil	24,350,000	29,200,000	36,750,000	53,600,000	62,132,000
All other	3,650,000[2]	2,500,000	3,750,000	3,850,000	5,889,000
Total fuel	$179,150,000	$178,250,000	$244,500,000	$306,500,000	$364,392,000
Forest Products:					
Cross ties (treated and untreated)	$19,750,000	$27,550,000	$44,000,000	$75,500,000	$83,421,000
Switch and bridge ties (treated and untreated)	3,040,000	4,250,000	7,500,000	9,150,000	10,642,000
Timber and lumber	16,250,000	18,100,000	21,500,000	43,550,000	55,002,000
Other forest products	2,145,000	2,300,000	3,250,000	6,400,000	8,486,000
Total forest products	$41,185,000	$52,200,000	$76,250,000	$134,600,000	$157,551,000
Iron and Steel Products:					
Steel rail (new and second-hand)	$10,650,000	$15,500,000	$41,500,000	$75,000,000	$94,195,000
Wheels, axles and tires	19,050,000	18,250,000	26,500,000	32,700,000	41,269,000
Track materials, fastenings, etc.	16,950,000[3]	18,500,000	32,750,000	53,700,000	70,971,000
Structural and bar steel, forgings, shapes, etc.	13,750,000[4]	7,800,000	25,200,000	39,200,000	57,330,000
Flues and tubes for boilers	3,390,000	1,700,000	4,650,000	6,200,000	7,194,000
Telegraph and telephone, interlocking and signal	6,245,000[5]	6,000,000	13,500,000	25,000,000	30,878,000
Bolts, nuts, washers, rivets, springs, etc.	8,550,000[6]	3,950,000	9,500,000	14,800,000	20,272,000
Locomotive and car castings	19,150,000[7]	19,400,000	27,750,000	47,500,000	65,086,000
Machinery, boilers, other iron and steel	14,950,000[8]	9,450,000	20,750,000	35,600,000	50,645,000
Total iron and steel products	$112,685,000	$100,550,000	$202,100,000	$329,700,000	$437,840,000
Miscellaneous:					
Cement	$1,350,000	$1,750,000	$4,950,000	$5,100,000	$7,628,000
Lubricating and illuminating oils, etc.	13,340,000[9]	14,300,000	15,500,000	18,200,000	24,328,000
Metals and metal products	19,550,000[10]	11,250,000	20,800,000	41,500,000	57,497,000
Ballast	5,160,000	9,300,000	6,850,000	18,500,000	23,750,000
Air-brake materials and appliances for locomotives	8,650,000[11]	5,150,000	11,750,000	18,000,000	25,043,000
All electrical materials	6,950,000	5,250,000	13,750,000	14,700,000	17,641,000
Stationery and printing	11,575,000	14,400,000	18,500,000	20,300,000	25,567,000
Supplies for dining cars and restaurants	9,350,000	8,500,000	19,750,000	21,500,000	28,899,000
Rubber and leather goods	4,505,000	2,950,000	4,500,000	7,500,000	9,657,900
Paint supplies, drugs and chemicals	14,900,000	13,700,000	14,500,000	26,800,000	35,985,000
Train and station supplies and miscellaneous	29,400,000[12]	27,450,000	41,300,000	75,600,000	113,757,000
Total miscellaneous	$124,730,000	$114,000,000	$172,150,000	$267,700,000	$369,752,000
Grand Total	$457,750,000	$445,000,000	$695,000,000	$1,038,500,000	$1,329,535,000

* Data for 1930, 1931, 1932 and 1933 compiled by *Railway Age;* data for 1929 by Bureau of Railway Economics. Figures include foreign-line freight.
[1] Includes $900,000 anthracite.
[2] Includes $1,750,000 gasoline.
[3] Includes $5,750,000 of switch work and $11,200,000 of fastenings and accessories.
[4] Includes $7,950,000 of bar steel; $4,800,000 of forgings.
[5] Includes $4,500,000 of interlocking and signal material.
[6] Includes $6,075,000 of bolts, nuts, etc.
[7] Includes $6,070,000 locomotive castings and $13,080,000 car castings.
[8] Includes $3,775,000 track tools and motor-car parts; $4,050,000 fuel and water-station material; $1,160,000 machinery, and $2,750,000 of boiler steel.
[9] Includes $1,550,000 of lubricating oil and $9,450,000 of illuminating oils.
[10] Includes $12,785,000 of copper materials and $2,335,000 of pipe and fittings.
[11] Includes $5,485,000 of locomotive appliances.
[12] Includes $1,150,000 of automotive materials.

Table III—Purchases of Representative Railroads, 12 Months, 1933

	1933					
	Fuel	Cross Ties	Rail	Other Material	Total	1932 Total
A. C. & Y.	$54,638	$44,549	$5,606	$81,583	$186,376	.....
A. T. & S. F.	7,848,850	824,175	1,025,537	7,813,949	17,512,511	$18,759,41
A. B. & C.	135,780	56,102	.....	345,204	537,086	531,29
A. C. L.	2,702,992	325,056	.....	3,865,656	6,893,704	7,288,021
B. & O.	5,201,718	67,360†	.....	8,029,136	13,298,214	10,854,651
Bang. & Aroos.	344,396	166,347	81,391	384,757	976,891	1,083,687
B. & A.	1,902,338	181,323†	.....	1,482,898	3,566,570	3,600,114
B. & M.	2,897,384	16,980	4,467	3,328,267	6,247,098	7,230,042
Burlington-Rock Island	8,993	.....	.....	58,567	67,560	.....
C. of Ga.	797,062	93,919	65,503	1,288,976	2,245,460	1,546,071
C. of N. J.	2,241,095	44,960	.....	1,405,566	3,691,621	4,162,985
C. Vt.	507,983	171,409	.....	422,139	1,101,531	1,105,798
C. & E. I.	736,995	187,698	41,393	791,027	1,759,899	1,706,899
C. & O.	3,126,921	327,928	1,275,285	6,214,561	10,944,695	8,204,672
C. & I. M.	122,591	19,250	40,719	288,924	471,485	304,234
C. & N. W.	4,520,307	133,430	171,003	6,943,222	11,767,976	11,535,452
C. B. & Q.	4,507,071	398,537	364,470	6,481,444	11,751,523	10,848,085
C. G. W.	1,370,630	392,187	139,088	943,676	2,845,581	2,900,613
C. I. & L.	358,160	32,700	.....	451,518	842,378	.....
C. R. I. & P.	4,291,844	47,702	.....	5,055,842	9,395,390	9,549,981
C. St. P. M. & O.	1,611,236	233,249	.....	993,373	2,837,867	2,998,866
Clinchfield	152,788	62,238	21,986	327,443	564,455	.....
C. & G.	50,593	34,321	1,443	83,714	170,071	154,873
D. & H.	1,447,973	464,001	4,660	2,525,807	4,443,592	5,281,944
D. & R. G. W.	1,021,115	322,707	54,115	1,511,399	2,909,336	2,730,602
D. T. & I.	165,609	26,977	.....	200,902	393,488	354,099
D. S. S. & A.	126,722	51,776	.....	89,790	268,288	.....
E. J. & E.	435,085	137,190	.....	1,000,876	1,573,161	795,600
Erie	2,840,527	741,194†	1,034,441	6,316,782	10,932,952	11,889,026
F. E. C.	577,468	141,165	.....	473,047	1,191,689	893,901
Ga. & Fla.	93,887	41,029	.....	94,943	229,859	193,513
G. N.	4,354,501	407,720	.....	3,693,736	8,455,957	9,646,987
G. M. & N.	226,483	68,849	18,628	319,221	633,181	.....
I. C.	5,604,401	322,667	167,282	7,965,218	14,059,568	14,086,347
I. T.	68,551	57,842	116,000	466,474	708,867	.....
K. C. S.	506,728	113,657	.....	785,213	1,405,598	1,349,832
L. S. & I.	88,941	9,590	.....	60,941	159,472	29,753
L. & N. E.	261,528	12,165	.....	230,915	504,608	527,182
L. & A.	126,392	30,796	.....	471,078	628,266	418,979
L. & N.	3,064,593	286,053	.....	5,942,698	9,293,354	8,659,317
Me. C.	1,068,422	118,589	.....	593,990	1,781,001	.....
M. St. P. & S. S. M.	1,714,127	618,895	.....	1,423,357	3,756,379	4,220,586
M.-K.-T.	.....	.....	.....	.....	3,168,577	2,601,214
M. P. Sys.	4,797,914	1,420,546	451,008	10,450,584	17,121,052	13,409,102
M. & O.	482,852	168,981	36,743	689,034	1,377,620	1,210,590
Montour	57,189	12,195	11,955	201,814	283,153	227,847
N. C. & St. L.	824,983	297,322	128,270	1,473,432	2,724,007	1,961,229
N. Y. C. Lines, except B. & A.	.....	.....	.....	.....	43,533,681	38,544,045
N. Y. C. & St. L.	2,164,327	.....	211,502	1,632,335	4,008,164	4,766,401
N. Y. N. H. & H.	958,077*	663,476‡	84,973	4,404,368	6,110,894	6,140,832
N. Y. O. & W.	779,180	92,847	49,353	617,974	1,539,354	1,753,722
N. & W.	.....	.....	.....	.....	12,407,477	.....
N. S.	224,891	175,207	358	275,183	675,639	.....
N. P.	.....	.....	.....	.....	7,787,378	8,582,760
Nw. P.	189,026	35,215‡	.....	74,028	298,269	392,670
Penna. & L. I.	13,811,562	.....	1,119,015	28,138,715	43,069,292	50,584,959
P. & P. U.	86,375	63,931	9,415	188,072	347,793	.....
P. M.	2,036,630	277,196	.....	1,360,118	3,673,944	2,365,791
P. & S.	31,634	27,976	13,874	55,883	129,382	152,580
P. S. & N.	55,787	37,328	.....	59,544	152,569	153,284
P. & W. Va.	73,123	26,712	34,323	171,130	305,288	171,951
Reading	3,265,640	17,658	25,451	2,697,379	6,006,128	7,006,791
Rutland	394,190	38,363	21,446	300,952	754,951	829,439
R. F. & P.	473,350	See O. M.	See O. M.	689,666	1,163,016	.....
S. A. L.	2,127,809	529,610	242,872	3,546,084	6,447,375	.....
St. L.-S. F.	2,230,874	985,509	525,033	4,833,001	8,574,417	5,642,883
St. L. Sw.	1,075,778	250	.....	720,612	1,796,640	1,291,709
Sou.	4,704,704	1,952,183	133,294	5,666,661	12,456,842	12,996,623
S. P., Pac. Sys.	5,347,809	714,338†	.....	4,904,816	10,966,960	13,101,869
S. P. & S.	342,900	66,488	20,992	361,119	791,499	826,963
T. C.	87,191	86,891	.....	186,057	360,139	242,157
T. & N. O.	934,544	235,017	.....	2,039,785	3,209,346	3,474,429
T. & P.	644,692	162,163†	14,142	1,717,885	2,538,882	2,570,694
U. P.	8,792,396	294,101	85,638	9,763,572	18,935,707	18,585,035
Utah	29,550	20,703	.....	59,465	109,718	.....
Wabash	2,079,156	2,592	28	2,613,334	4,695,706	5,020,883
W. Md.	615,120	96,923	257,206	1,236,610	2,205,859	2,052,506
W. P.	767,208	142,924†	68,273	916,639	1,895,044	1,767,255
W. F. & S.	15,123	31,340	.....	35,191	81,654	.....

*Excluding freight. †All ties. ‡Forest products.

Table IV—Quantities of Material Purchased—1933

	Bituminous Coal Net Tons	Fuel Oil Gal.	Cross Ties Units	Sw. & Br. Ties Bd. Ft.	Timber & Lumber Bd. Ft.	Rail G. T.	Cement Bbl.	Ballast Cu.Yd.
A. T. & S. F. Sys.	1,051,074	360,789,191	1,468,738	2,961,928	13,856,699	24,304	44,314	297,487
A. C. & Y.	25,868	1,870	42,768	No report	184,931	None	11	13,087
A. C. L.	976,718	709,358	543,738	2,757,304	14,488,071	None	6,315	78,118
Bang. & Aroos.	77,457	3,162	98,120	449,541	No report	1,899	483	None
B. & M.	756,192	372,048	16,288	568,008	4,097,996	97	1,518	12,939‡
B.-R. I.	159	None	None	None	209,878	No report	No report	No report
C. of N. J.	820,568	303,388	63,041	109,428	1,473,847	None	865	7,717
C. V.	114,170	64,828	121,736	377,207	.....	.....	.....	.....
C. & O.	2,006,386	None	324,634	4,804,303	6,383,655	31,656	57,124	756,873
C. & I. M.	69,692	None	17,500	130,865	709,671	1,938	None	None
C. B. & Q.	2,310,464	21,605,778	577,372	703,307	20,985,576	8,786	11,619	543,024
C. I. & L.	224,635	None	55,252	148,998	1,118,200	No report	250	13,147
Clinchfield	137,502	58,099	82,976	399,000	1,338,728	500	None	No report
C. & G.	22,433	None	45,839	No report	No report	102	No report	No report
D. & R. G. W.	654,949	56,270	593,364	716,508	2,299,077	1,245	478	None
D. T. & I.	70,520	12,000	35,610	314,509	469,384	None	55	660
D. S. S. & A.	32,957	None	120,899	81,658	217,218	None	38	None
F. E. C.	727	30,975,981	267,226	472,387	1,140,260	None	405	2,576
G. N.	1,045,936	79,594,806	802,691	265,117	10,500,000	None	No report	None
G. & F.	32,819	.....	80,178	184,879	619,089	None	3	None
G. M. & N.	115,773	243,395	139,474	448,686	1,291,145	887	314	52,528
I. C. Sys.	3,062,470	No report	520,808	No report	No report	4,180	None	No report
K. C. S.	82,198	25,052,160	137,321	767,001	1,572,691	None	1,160	65,611
L. S. & I.	23,294	2,118	18,552	124,540	409,813	None	7	510
L. & N. E.	70,076	16,121	391	5,736	No report	None	78	No report

‡ Net tons.

Table IV—Quantities of Material Purchased—1933 (Continued)

	Bituminous Coal Net Tons	Fuel Oil Gal.	Cross Ties Units	Sw. & Br. Ties Bd. Ft.	Timber & Lumber Bd. Ft.	Rail G. T.	Cement Bbl.	Ballast Cu.Yd.
.. & A.	201	13,551,563	49,880	314,090	1,272,893	None	96	78,723
.. & N.	2,309,701	None	288,182	3,557,545	18,474,776	None	9,426	624,651
de. C.	252,775	115,468	107,998	None	2,070,518	None	621	6,497‡
M. P. Sys.	2,003,746	164,474,691	2,187,165	(See cross)	No report	10,982	27,354	614,970
M. St. P. & S. S. M.	526,201	None	833,667	1,495,262	5,777,986	None	414	1,069
Montour	34,409	23,788	7,794	19,949	62,234	None	25	912
N. C. & St. L.	446,142	453,624	269,660	733,505	7,878,385	3,087	1,300	76,138
N. N.	9,179	None	22,214	No report	48,158	No report	None	No report
N. Y. C. & St. L.	837,024	None	None	94,669	3,633,258	5,253	2,862	131,745
N. Y. O. & W.	255,779	72,311	77,014	412,035	522,012	1,166	800	2,520
N. S.	91,698	82,747	328,137	164*	2,450,924	15	No report	No report
Penna. and L. I.	9,764,274	8,767,341	None	2,505,167	39,207,635	27,975	198,380	840,446
P. M.	630,038	None	224,857	394,040	2,591,500	None	153	95,372
P. & S.	17,971	1,100	29,202	83,522	46,200	560	28	390
P. S. & N.	29,987	None	33,703	94,922	33,540	None	315	None
P. & W. V.	53,380	16,265	30,163	207,364	No report	945	389	1,562
Rutland	120,000	None	40,048	294,619	1,415,768	1,215	No report	No report
St. L. Sw.	42,382	29,878,206	1,000	700†	4,273,644	None	64	17,961
T. C.	62,136	None	143,836	208,423	1,176,697	None	50	4,345
T. & P.	560	65,546,196	200,587	(See cross)	No report	No report	No report	114,672
Utah	27,754	None	11,907	None	8,115	None	None	None
W. F. & S.	44	1,512,330	35,496	65,357	50,354	None	None	None
U. P. Sys.	2,681,307	96,679,599	372,261	701,770	19,443,026	1,928	11,405	2,872
W. Md.	400,132	395,345	148,474	No report	No report	6,685	3,029	No report
C. of Ga.	381,376	44,668	251,617	1,364,330†	2,313,758	1,611	603	35,183
Sou.	3,158,917	1,437,009	2,346,652	3,736,621	21,494,057	3,826	4,169	274,512
D. & H.	371,711	424,012	244,835	961,141	5,548,393	201	2,508	20,225
B. & O. Sys.	5,409,743	None	None	232,917	13,163,528	None	30,199	256,423

* Sets. † Units. ‡ Net tons.

plies than they would have expended if they had continued to buy as much per year as in 1929.

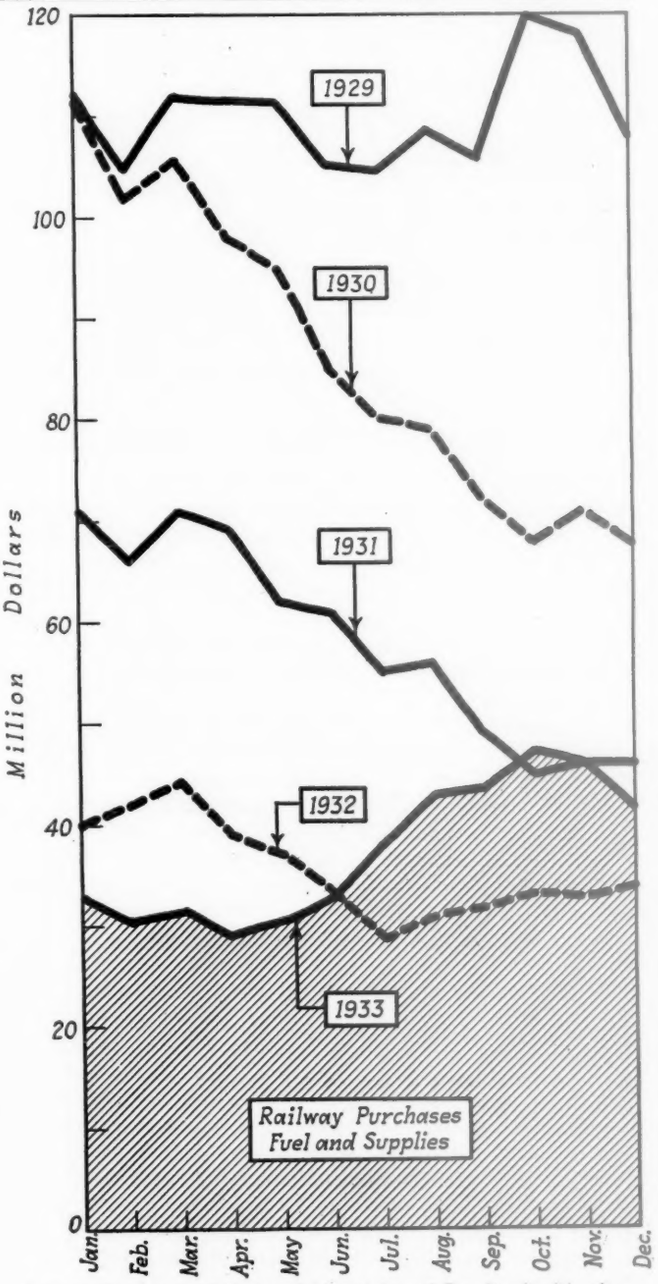
Total purchases last year, according to reports received from the railroads, included approximately $179,150,000 or 38 per cent of the total for fuel; $41,185,000, or 9 per cent, for forest products; $112,685,000, or about 28 per cent, for iron and steel products; and $124,730,000, or about 25 per cent, for a wide variety of miscellaneous materials. As nearly as can be estimated from the classified figures of railroads operating 185,000 miles of line, fuel purchases included $149,650,000 for soft coal, $1,500,000 for hard coal, $24,350,000 for fuel oil and $3,650,000 for other fuel, including $1,750,000 for gasoline. About $140,000,000 of the fuel was used in locomotives.

Expenditures for forest products included $19,750,000 for cross ties, $3,040,000 for switch and bridge ties, and $16,250,000 for timber and lumber, about $7,650,000 of which was purchased for bridge and building forces and $8,600,000 for repairing cars.

Iron and Steel Products

Total expenditures for iron and steel included approximately $10,650,000 for rail, $19,050,000 for wheels, tires and axles, and $16,950,000 for track fastenings and other track materials. In addition, about $7,950,000 was spent for bar and sheet steel, $4,800,000 for car and locomotive forgings, $3,990,000 for boiler tubes, $6,245,000 for interlocking, signal, telegraph and telephone materials, $6,075,000 for bolts, nuts and washers, $19,150,000 for steel castings and $5,485,000 for locomotive appliances.

The railroads are also estimated to have spent $13,350,000 last year for lubricating and illuminating oils, greases, etc., $10,750,000 for articles of copper and brass, $5,160,000 for ballast, $6,950,000 for electric materials, $11,575,000 for stationery and printing, $9,350,000 for supplies for dining cars, $4,505,000 for rubber and leather goods and fabrics, $12,900,000 for paint supplies, glazing materials and various chemicals, and $5,225,000 for supplies for train crews and station forces. Based on reports of 32 roads operating about 60,000 miles of line, the purchases included $3,775,000 for track tools and motor-car parts, $2,335,000 for small pipe and fittings; $4,430,000 for nails and other hardware, including $1,000,000 for hand tools; $2,000,000 for timber preservatives, $1,350,000 for cement, at least $5,950,000 for



Railway Purchases of Fuel and Materials and Supplies by Months, January, 1929, to January, 1933

brick and similar building supplies, and at least $1,145,000 for automotive materials.

Disregarding fuel, the purchases last year involved approximately $85,405,000 for maintenance of way and structures, $113,670,000 for materials required for the maintenance of equipment, $37,950,000 for materials involved chiefly in conducting transportation, and $40,655,000 for materials, the use of which is common to all departments.

Purchases in the aggregate involved 82,000,000 tons of bituminous coal; 1,700,000,000 gal. of fuel oil; approximately 23,200,000 gal. of gasoline and other fuels for internal-combustion engines; 975,000 bbl. of cement; 27,000,000 cross ties; 83,000,000 ft. of switch and bridge ties; at least 595,000,000 ft. b. m. of timber and lumber; approximately 8,500,000 cu. yd. of ballast; about 8,500,000 gal. of lubricating oils and 140,000,000 gal. of illuminating and other oils; and about 268,000 tons of rail.

More Repair Parts

Dollar for dollar, the roads spent 53 per cent less for fuel in 1933 than in 1929 and 5 per cent less than in 1932, while expenditures for forest products were 70 per cent under those of 1929 and 22 per cent under the estimated expenditures in 1932. On the other hand, expenditures for materials of iron and steel in 1933, while 74 per cent less than in 1929, were 12 per cent above the expenditures in 1932, and purchases of miscellaneous materials were 65 per cent less than the corresponding expenditures in 1929 and were 10 per cent above those in 1932. During 1933, the roads bought fewer ties, less lumber, less rail and track materials, less cement and less ballast in the aggregate than in 1932, but increased by a considerable extent their purchases of wheels, tires and axles, forgings and shapes for locomotives and cars, boiler flues, bolts, other repair parts for locomotives and cars, as well as their purchases of air-brake materials and appliances, electrical material and their expenditures for paint and hardware.

Significant of the trend of purchases, in so far as shown by expenditures alone, is the fact that purchases of iron and steel, after declining from 33 per cent of the total purchases in 1929 to 22.5 per cent in 1932, increased to 25 per cent of the total in 1933. Again, total purchases, after declining from 21.8 per cent of operating revenues in 1929 to 14.1 per cent in 1932, rose to 14.6 per cent of operating revenues in 1933. The fact that the expenditures of the railroads have been higher for several months than in 1932 and the further fact that they included only a part of the allotment made for supplies out of loans recently authorized by the government tends to substantiate the suggestions that railway purchases are definitely expanding. Of 50 roads for which comparable data is available, 30 expended more for materials in 1933 than in 1932.

A TOTAL OF 1,276 RETIRED EMPLOYEES of the Missouri Pacific Lines were drawing lifetime pensions amounting to $735,298 a year, or $61,274 a month, on February 1. The total number who have been pensioned since the Missouri Pacific pension system was established on July 1, 1917, is 2,130. Of this number, 849 have died and five have since returned to active service. The average age of pensioned employees on the Missouri Pacific proper was 67 years, on the International-Great Northern 69 years, and on the Gulf Coast Lines 70 years. The average period of service on the Missouri Pacific was 33 years, on the International-Great Northern 32 years, and on the Gulf Coast Lines 20 years.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended February 24, which included a holiday, amounted to 573,371 cars, a decrease of 25,525 cars as compared with the week before, but an increase of 111,056 cars as compared with the corresponding week of last year and of 37,873 cars compared with 1932. Coal loading showed an increase as compared with the week before but all commodity classifications except grain and grain products showed increases as compared with the corresponding week of last year.

The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, February 24, 1934

Districts	1934	1933	1932
Eastern	134,405	104,318	125,933
Allegheny	115,059	86,280	107,960
Pocahontas	45,095	36,118	35,810
Southern	89,502	73,500	82,097
Northwestern	62,726	52,147	61,308
Central Western	79,412	68,500	78,189
Southwestern	47,172	41,452	44,201
Total Western Districts	189,310	162,099	183,698
Total All Roads	573,371	462,315	525,498
Commodities			
Grain and Grain Products	27,452	28,322	32,627
Live Stock	15,291	14,429	18,375
Coal	155,026	103,360	108,203
Coke	10,068	4,907	5,959
Forest Products	22,505	14,272	19,640
Ore	3,211	1,712	2,833
Merchandise L.C.L.	144,142	143,492	169,733
Miscellaneous	195,676	151,821	178,128
February 24	573,371	462,315	535,498
February 17	598,896	517,529	572,265
February 10	572,504	504,663	561,535
February 3	564,098	486,059	573,923
January 27	561,566	475,292	560,343
Cumulative total 8 weeks	4,486,431	3,894,774	4,509,992

The freight car surplus for the first half of February averaged 412,679 cars, a reduction of 21,749 cars as compared with the number in the last half of January. The total included 238,351 box cars, 118,035 coal cars, 24,863 stock cars, and 12,528 refrigerator cars.

Car Loading in Canada

Car loadings in Canada for the week ended February 24 totaled 41,463 cars which was an increase over the previous week of 511 cars and the index number rose from 69.98 to 72.39. Compared with 1933 loadings, the increase was 7,524 cars.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
February 24, 1934	41,463	23,465
February 17, 1934	40,952	23,389
February 10, 1934	40,595	21,563
February 25, 1933	33,939	17,627
Cumulative Totals for Canada:		
February 24, 1934	319,250	170,495
February 25, 1933	256,215	137,184
February 27, 1932	328,585	166,712

AT THE REQUEST of the commissioners of the District of Columbia, Senator King and Representative Norton on March 5 introduced bills in Congress to authorize steam railroads to electrify their lines within the District. The bill was introduced because of the electrification program of the Pennsylvania.

Railroad Labor Asks Six-Hour Day

Senate committee holds hearing on bill prepared by Railway Labor Executives' Association

WASHINGTON, D. C.

DEMANDS of the railroad labor organizations for a six-hour basic day, to offset by greater employment or increased wages the effects of the technological improvements introduced by the railroads to compensate for the increased labor cost resulting from the adoption of the Adamson law and the eight-hour day, were voiced before the Senate committee on interstate commerce on March 1 and 2 at a hearing on the bill introduced by Senator Black at the request of the Railway Labor Executives' Association. Testimony in opposition to the bill was then presented on March 6 and 7 on behalf of the Association of Railway Executives the American Short Line Railroad Association, the Railway Express Agency, the Pullman Company, and the National Industrial Traffic League on the ground that a six-hour day would again greatly increase the cost of railroad operation and Chairman Dill of the committee announced that it would consider whether to devote further time to the bill at this session of Congress.

A. F. Whitney, president of the Brotherhood of Railroad Trainmen and Chairman of the Railway Labor Executives' Association, was the first and principal witness for the bill and was followed by Timothy Shea, assistant president of the Brotherhood of Locomotive Firemen and Enginemen, J. G. Luhrsen, president of the American Train Dispatchers' Association, J. A. Phillips, senior vice-president of the Order of Railway Conductors, and L. E. Keller, of the Brotherhood of Maintenance of Way Employees. At the outset Chairman Dill asked whether the bill would require a maximum of 30 hours a week or only an average of 6 hours a day, but Mr. Whitney explained that it meant neither, merely proposing to change the standard measure of a day's work and a day's pay from 8 to 6 hours without reduction in the present wages for a standard day.

The Labor Argument

The argument of the labor leaders was not only that a six-hour day is necessary to increase employment and purchasing power, but that the employees have "earned" it by the great increase in their "productive efficiency," as measured by the volume of traffic handled by the railways per employee, and because of the increased strain and responsibility placed upon them. It was recognized that much of the increased efficiency was attributable to the large expenditure of capital for improvement of the railroad plant and equipment, but resentment was expressed because this had involved a capital cost and because while operating expenses were reduced by $1,300,000,000 from 1920 to 1929, about $800,000,000 of it was saved in wages.

The witnesses admitted that much of the increased employment resulting from the adoption of the eight-hour day had been lost as the railroads improved their plant and increased their operating efficiency in an effort to offset the increased labor cost and reduced rates, but they appeared perfectly willing to try the same thing again while arguing that the railroads would also do the same thing again. However, the labor organizations have another scheme this time for preventing some of the increase in operating efficiency by their bill to limit the length of trains and thus increase the number of train crews. If this should increase the capital cost for more locomotives presumably it would be a subject for controversy at another hearing some years hence on a five-hour day bill. After the argument for increased purchasing power had been used, however, it was partly dropped to make way for the contention that the railroads would soon absorb much of the increased cost, although there was a suggestion that the purchasing power might be transferred from the bondholders to the employees.

Mr. Whitney's Testimony

Mr. Whitney described the railroads as "the victims of the system of speeding up by improved machinery to reduce unit costs" and said that from 1920 to 1929 the gross-ton miles per employee had been increased 52 per cent while wages had been reduced. His exhibit showed that in 1929 the average earnings had been reduced only about 4 per cent, but by 1932 the reduction was about 19 per cent, while the increase in gross ton-miles had been reduced to 40.8 per cent. Other statistics showed considerable reduction in "productive efficiency" between 1929 and 1932 but the inference was left that this might not have happened if all the savings had gone to labor.

Mr. Whitney said the railroads had put $7,000,000,000 into their plant and thereby increased their operating efficiency but that this had increased their fixed charges and that they "took care of that by discharging employees." "Instead of giving the employees the increases they had earned by increased productivity," he said, "they distributed it in increased profits." Mr. Whitney suggested that most of the cost of the change to a six-hour basis, which he estimated at $250,000,000 a year, could be met by reducing interest rates 2 per cent, or about $220,000,000 a year; and in disputing the railroads' estimates that the cost would be about $600,000,000 he said they had ignored the factor of increased efficiency. He estimated that a six-hour day would probably increase the number of employees by 250,000, based on 1931 conditions, but he said no one knows the extremes to which the railroads will go in making further technological improvements by which the added cost would be absorbed. He said that railroad employment had reached its lowest ebb in April, 1933, and that notwithstanding all the efforts and pressure of the government the number of employees today is only about 46,000 or 2 per cent greater.

Introducing elaborate statistical exhibits beginning with the year 1920, when railway employment and wage payments were at their peak, following the adoption of the eight-hour day, and the payroll took nearly 60 per cent of the operating revenues while almost nothing was left for net railway operating income, Mr. Whitney and the other labor witnesses showed large increases in what they called the increased productivity and output of labor per employee, although the same exhibits showed that the operating revenues per employee had been reduced from $3,054 in 1920 to $3,031 in 1932, failing to note that the amount paid the railroads for a ton-mile had

been reduced by about 22 per cent. It was shown that the railroads in 1920 paid $271,731,669 in dividends, but it was not shown that they had not earned them in that year but derived them from a temporary government guaranty. In 1930 the dividends had increased to $497,024,912 but in 1932 they had fallen about 66 per cent under 1920 while wage payments had dropped nearly 60 per cent. The number of employees in 1932 was 51 per cent of the number in 1920 while the revenues in 1932 were only 50.6 per cent. The ton-miles per employee had been increased 11.8 per cent, the ton-miles per hour of service 30.7 per cent, the ton-miles per dollar of compensation 38.9 per cent, the traffic units per employee 1.5 per cent, and the traffic units per dollar of compensation 26 per cent.

"It is a mere platitude now to say that we have suffered an economic breakdown because of an inequitable distribution which has brought about an inhuman concentration of wealth," Mr. Whitney said. "The very fact of suffering amidst plenty is sufficient proof that our problem arises out of maldistribution. There are approximately 800,000 former railroad workers wholly unemployed today and another 400,000 partially employed and not receiving a sufficient income to maintain themselves and families in decency. Considerable national effort has been made to relieve other classes of people in this nation, but so far nothing has been done in direct aid of these suffering railroad workers. The NRA principles were not made applicable to the railroad industry.

"The theory back of the NRA is that the great increase in the productivity of workers absolutely necessitates shorter work hours. Nowhere is this increase in productivity of workers more pronounced than in the railroad industry. In the last decade, productivity of railroad workers has increased by leaps and bounds, but nothing has been done to overcome its evil effects on the workers. The result is that hundreds of thousands of skilled railroad workers of years of training in the safe and efficient transportation of people and property have been forced into the breadlines. While this steady decrease in railroad employment has been in progress, large dividends have been paid (the largest in history in the year of 1930), and the public treasury has been laid open to the railroads.

"Whatever the future may hold in the way of increased industrial activity and larger traffic volumes for the railroads, relief from the intolerable unemployment in the railroad industry cannot be hoped for on the sole basis of greater traffic volumes. Railroad managements have stated they can now handle a twenty per cent increase in business without any increase in employment. The improvement in efficient operation and the increase in the productivity of the railroad employees has been so pronounced that experts on the subject have stated the railroads will be able to obtain as large a net return as that of 1929 if only fifty per cent of the depression decline in traffic is restored.

"For years mankind has been striving to improve his lot. During the span of our lives, the great increase in science and technology has pointed the way to an improved standard of living for everyone. We need only to adopt a distribution system that will make this potential prosperity available to all. Shorter work hours and the resulting increase in work opportunities is the most important pillar in this new structure providing more equitable distribution."

Other Labor Leaders Argue

Timothy Shea said the railroads had been practically rebuilt so that a smaller number of men could transport an increased traffic. The labor organizations, he said, are not opposed to technological improvement but believe that industry should take care of the men displaced by reducing the working day, by increasing wages or by other means until the surplus is absorbed. He said there was an appreciable increase in employment after the enactment of the Adamson law but that the railroads had offset it by speeding up. Senator Dill asked if he thought that, with a six-hour day, the railroads would again begin to speed up. Mr. Shea replied that they would and could do so and that when a freight train speed of 16⅔ miles per hour is reached the six-hour day would not increase the operating cost. He pointed out that there is now a five-hour day in through passenger service. "There is enough in the railroad industry if the output is fairly distributed," he said.

Mr. Luhrsen's argument was mainly devoted to the contention that an eight-hour day is too strenuous for a dispatcher under present conditions; that the increased length of divisions and the speeding up of trains have so increased the intensity and responsibility of the work that a six-hour day is long enough. He exhibited to the committee a train sheet for a busy division to show the intensity of the work and asserted that the railroads have also reduced the number of dispatchers.

J. A. Phillips, senior vice-president of the Order of Railway Conductors, said the employees are several years late in asking for a six-hour day; that they should have had it years ago and be asking now for a five-hour day. He pointed out that the provisions of the bill would not mean that a conductor would work only six hours a day but he said the railroads would undoubtedly rearrange their operations to avoid the increased cost and that the overtime now paid would go a long way toward paying for additional crews.

L. E. Keller, representing the Brotherhood of Maintenance of Way Employees, described the large reduction in the number of such employees during the depression and as a result of the use of labor-saving devices, saying the railroads had deferred maintenance work to the amount of a billion dollars and that many of the men were now working only a few days per month.

Railroads Point to Increased Cost

Enactment of a law providing for a six-hour day for railroad employees without any reduction in pay would not only increase by approximately $600,000,000 the operating expenses of the railroads but would threaten many of the large lines with bankruptcy, tend to impair railway service, and retard recovery, J. Carter Fort, general solicitor of the Association of Railway Executives, told the committee on March 6. "This bill if enacted into law," said Mr. Fort, "would place an immediate added burden of expense on the railroads of approximately $600,000,000 in a normal year such as 1930 and of approximately $365,000,000 in a depression year such as 1932. These are reliable estimates developed by the Interstate Commerce Commission after an extensive and painstaking investigation.

"This staggering burden would fall upon the railroads at the most critical period in their history. If the six-hour day with eight hours pay had been in effect in 1932, the result would have been that the railroads of the country as a whole would have failed by a large amount to earn their actual expenses without any regard for interest charges or other return on investment.

"To impose this enormous extra expense on the railroads when the money to meet it is not in hand or in sight would be, in our opinion, a reckless course to

follow. The further impoverishment of the railroads would certainly not be a contribution toward general recovery. It would impair railroad service, and adequate railroad service is essential to all industry. It would curtail railroad purchasing, and the railroads are ordinarily the largest purchasers from the heavy industries in which the unemployment situation is most acute. It would strike a blow at public confidence. For these reasons, and others, we believe that this bill, if it were enacted, would seriously handicap and retard an increase in business activity, which is the chief hope for improvement in the general employment situation."

Mr. Fort also told the committee that as to train and enginemen, who are paid on the dual basis of miles or hours, and represent about 28 per cent of the payroll, the bill would not operate to increase employment in any substantial way, but would increase the pay of such employees for the same work due to the increase in overtime which it would necessitate. For other employees it would increase the hourly rate of pay by 33⅓ per cent. "The hourly wage rates," he continued, "are still on the 1929 level except for the 10 per cent deduction now in effect. Taking into account the 10 per cent deduction, hourly rates now being paid railroad employees are 220 per cent of what they were in 1916. The cost of living stands at approximately 120 per cent of what it was in 1916. The hourly wage rates for railroad workers have not been reduced to the same extent that they have been for workers in other industries, and yet the proposal here is to increase those rates 33⅓ per cent."

Had railroad employees been on a six-hour day basis in 1930, Mr. Fort said, the aggregate net income of the Class I railroads of the country in that year instead of having been $524,000,000 would have been wiped out and a deficit in net income created of about $23,000,000. "In a subnormal year such as 1932," he said, "the effect of the added cost would have been to increase the deficit of that year to $471,000,000."

While other industries, Mr. Fort said, are free to raise the price of their products to meet an increased cost, the railroads cannot raise their rates without the consent of the Interstate Commerce Commission. He also called attention to the fact that Congress has not yet received the report of the investigation of the subject being made by Co-ordinator Eastman, which will be related to other phases of the transportation problem.

Replying to some of the statements of the labor witnesses Mr. Fort pointed out that a passenger trainman mentioned as making a round trip between New York and Washington in 11½ hours without overtime would be paid at the rate of 2⅓ days for 230 miles each way and that his hours would not be affected by a six-hour day. He also showed that even if the average speed of a freight train were increased to 16⅔ miles per hour there would still be overtime on many trains below the average speed. He also showed that even if the traffic units per man-hour are increased the labor cost may be increased by increases in wage rates, illustrating by showing that in 1917 the cost per man-hour of the men affected by the Adamson law was 96 cents per 1,000 traffic units but in 1932 the cost was $1.42, or 48 per cent higher. In other words the railroads have not absorbed the increased cost of the Adamson law. In reply to a question he said that freight rates are now much higher than before the Adamson law, although there has been a decrease in the average ton-mile earnings since 1922 of about 22 per cent. If there should be a gradual absorption of the increased cost, Mr. Fort said, it would be a long time before it could be effected and it would be the result of new machinery which would involve an added capital cost. Also, the tendency would be to postpone maintenance work in years in which the railroads had not the money to hire more men and this would tend to increase the instability of railroad employment.

Referring to Mr. Whitney's statement as to the number of men the interest on the $7,000,000,000 expended for improvements might put to work, Mr. Fort pointed out that less than $1,000,000,000 of the amount was raised by bond issues and only about $1,500,000,000 by stock issues. Referring to Mr. Luhrsen's testimony as to the great strain on the train dispatchers, and in reply to a question by Senator Dill as to whether this did not affect the safety of the traveling public, Mr. Fort said that the work of the train dispatchers has been done so well that an accident by reason of an error of a dispatcher is almost unknown and that this would not indicate that they are working under an undue strain.

Dr. Julius H. Parmelee, director of the Bureau of Railway Economics, testified as to a series of statistical exhibits showing the present economic condition of the railroads to show that they are in no position to stand such an increase in operating costs as is proposed.

"A total of 87 railways operating 68 per cent of all railways of Class I failed to earn their interest and other fixed charges in 1932," he said. "Had the six-hour day principle been in effect in that year, a total of 107 railways, operating 92 per cent of the total mileage, would have failed to earn their fixed charges. The corresponding percentage in 1933 would have been 91 per cent. In other words, less than ten per cent of the railway mileage would have earned any net income at all in either 1932 or 1933, had the six-hour principle been applied to the operations of those years. Any large cumulative increase in operating costs tending to continue rail operations 'in the red' would have a disastrous effect on the nation's economic structure and on the general employment of labor."

Dr. Parmelee said that the railroads make an important contribution to the nation's economic activity through the distribution of large sums of money which they expend in various ways and which furnish employment to many hundred thousand workers in addition to keeping their own employees at work. "Efforts now under way," he said, "to increase the capital expenditures of railway companies are designed to benefit reemployment in these other industries, but these efforts must depend for their successful accomplishment on the future net earnings and credit of the railways."

Short Lines Oppose Bill

W. L. White, president of the American Short Line Railroad Association, which has a membership of 333 short line railroads, total mileage 11,600 miles, concurred in what was said on behalf of the Class I carriers, with respect to the undesirability of this legislation and in any event urged that if the bill is favorably acted it be so amended as to exclude the independently owned and operated short lines 100 miles or less in length, and the electric lines, using the same exclusion language as was used in the Adamson act.

"We believe it has been demonstrated to you that the railroads, generally, cannot financially stand such a wage increase, without an increase in freight and passenger rates," he said. "Even if it were possible to obtain an increase in rates, it would not be desirable, because it would drive the traffic to the trucks. Especially is this true of the traffic on the short line railroads.

"Since the bill does not provide for any maximum

number of hours per week, but provides only for an increase in wages, it cannot have the results which the proponents claim for it so far as relieving unemployment is concerned. Of necessity, the railroads would be compelled to work their employees more than six hours per day, and pay them the punitive overtime, rather than to discontinue them at the end of six hours and put on additional employees who would, in many instances, be paid for constructive time which they did not work.

"During the past four years more than half of these short lines have not paid bond interest. Those not having paid bond interest, which have continued in operation, have been able to do so by reason of the waiver of bond interest by bondholders, or by going into receivership or trusteeship.

"The increased financial burden which this bill would impose upon the railroads simply means cessation of operation for the majority of the short lines. This would be very detrimental to hundreds of thousands of individuals, firms and corporations, having property along these railroads, since it has been demonstrated time and again that property values decrease very greatly where these short line railroads cease operation..

"So far as the short lines are concerned, the bill would further swell the ranks of the unemployed, because it would throw out of work many men now employed by them, by reason of the fact that they would be compelled to go out of business. In addition, there are many employees of the industries served by them that would likewise be thrown out of employment upon abandonment of the roads."

N.I.T.L. Objects to Increase in Railroad Costs

R. C. Fulbright, chairman of the Legislative Committee of the National Industrial Traffic League, said the league is unalterably opposed to any legislation which will substantially increase the operating expenses of the American railroads at the present time. The Interstate Commerce Commission has found that the application of the present pay for a basic day's work to a six-hour day would increase the payroll expenses of the railroads approximately 22.2 per cent, he said, and this would impose a burden of transportation costs upon the railroads which in turn would have to be passed on to the shippers and the consuming public, or else jeopardize the continued successful operation of the railroad facilities. "Under the conditions which exist today we believe that any effort to increase substantially the wage costs of the railroads will defeat its own purpose, and that it will result in further substantial decreases in the total amount of railroad employment of labor.

"The time has passed when the railroads can automatically pass increased railroad operating costs to the shippers in the form of increased freight rates. When interurban transportation in this country was a monopoly in the hands of the railroads, it was an easy matter to meet increased operating expenses by readjustment of the rate structure. Today other transportation agencies have been developed which actively compete for a very large portion of the total railroad traffic. The railroads have found it necessary to make substantial reductions in their charges for transportation on numerous commodities all over the country in order to meet this competitive situation. It is not possible for them to increase such rates at this time without losing such traffic as they have regained from the competitive agencies.

"We do not believe that the railroads can continue to operate their plants efficiently if they are confronted with a substantial increase in their operating costs and are unable to increase their operating revenues. Already a large number of important railroad systems are in bankruptcy or upon the verge of bankruptcy, and a very much larger number will follow if an immediate increase of 20 per cent in their payrolls should be forced upon them. It will be impossible to finance the operations of the railroads and keep their properties in good condition unless there is some prospect of an ultimate return to the investors. The result will be the continuance of a policy of undermaintenance and a lack of development of railroad traffic which in the end will result in less employment and less ability to meet the pal-roll in order to carry on the necessary operations."

D. B. Fleming, assistant general manager of the New York Central, replied to Mr. Luhrsen's statement regarding the exacting duties of a train despatcher and explained that the train sheet which he had exhibited, covering a busy division on the New York Central, looked complicated but really required little of the despatcher at most times except to record reports of trains passing. He said that train movements are now so largely governed by timetable or by signal indications that the work ordinarily imposes no strain on the despatcher.

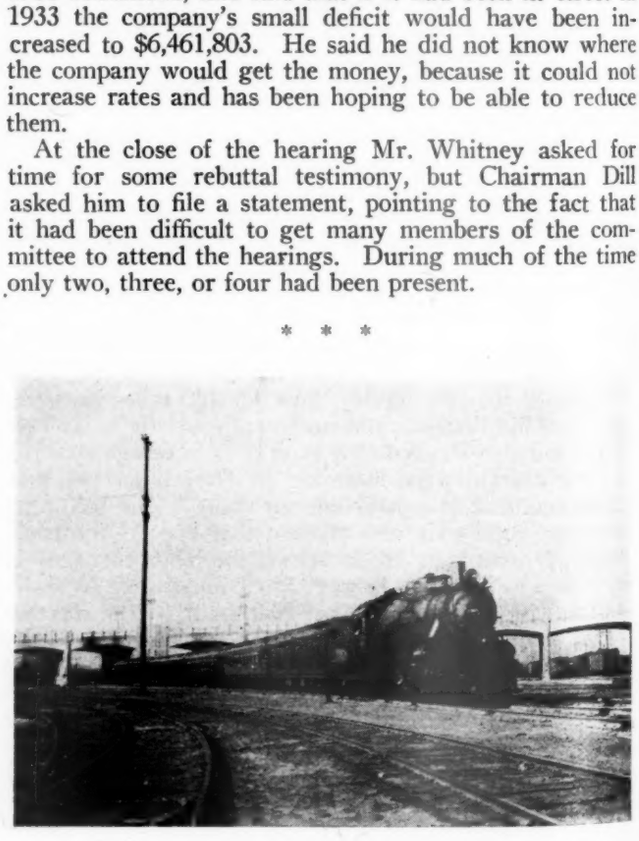
C. D. Cass, general counsel of the American Transit Association, asked that electric railways be exempted from the provisions of the bill. Senator Dill said he thought the language was intended to except electric lines.

L. R. Gwyn, vice-president of the Railway Express Agency, said his company could not absorb the expenses that would be required for the adoption of a six-hour day and that passage of the bill would make it impossible for the business to exist.

G. A. Kelly, general solicitor of the Pullman Company, referred to testimony presented before the Interstate Commerce Commission that a six-hour day would cost the company $13,000,000 a year, which estimate the commission had reduced to $11,000,000, representing 1930 conditions, and said that if it had been in effect in 1933 the company's small deficit would have been increased to $6,461,803. He said he did not know where the company would get the money, because it could not increase rates and has been hoping to be able to reduce them.

At the close of the hearing Mr. Whitney asked for time for some rebuttal testimony, but Chairman Dill asked him to file a statement, pointing to the fact that it had been difficult to get many members of the committee to attend the hearings. During much of the time only two, three, or four had been present.

* * *



A Santa Fe Train Leaving Los Angeles, Cal.

Odds and Ends . . .

Horse Comes Back

The horse market, once an industry of large proportions in Montana, is taking on new life this year, according to E. L. Hoppel, livestock agent of the Northern Pacific. From various Montana points, he says, the movement of horses has been increasing steadily, some of the horses being shipped as far east as Ohio. For several years there has been practically no movement of work horses, and the present demand indicates a rehabilitation of farms in various sections.

Reward Boy Who Saved Train

Paul Evans, an 11-year-old schoolboy of Ponemah, N. H., who averted what might have been a serious train accident by signaling a Boston & Maine train in time for the engineer to stop it short of a heavy truck which had stalled on a grade crossing, has been rewarded by the railway. He received a gold watch from the hands of E. S. French, president of the Boston & Maine, and, probably to his even greater delight, was given a ride from Ponemah to Boston in the cab of a B. & M. passenger train.

Salvage from a Wreck

The Northern Pacific is richer by $1, thanks to a farmer who resides near Finlayson, Minn., and who has a conscience. About 20 years ago, there was a derailment on the Northern Pacific between St. Paul and Finlayson and the right of way was littered with salt herring from a broken merchandise car. A dozen of these herring came into the farmer's possession via his brother who had picked them up. He never felt quite right about it, however, but now that he has sent in his $1, he will doubtless rest more easily.

Wrong Address

The Washington correspondent of the Boston Globe is responsible for the following story: "In Washington they are chuckling over a letter which went to Joseph B. Eastman, of the Interstate Commerce Commission, who is now the Judge Landis of the railroad world. It was a letter requesting Mr. Eastman to help raise the price of railroad ties. He returned the letter to the man who wrote it, scribbling across the top of the sheet: 'Sorry, but my job is to keep prices down. Try the N. R. A. That's their job.'"

Fifth Birthday for the "Blue Comet"

The fifth birthday of the "Blue Comet," the Central of New Jersey's leading New York-Atlantic City train, was celebrated on February 21. To mark the occasion, the engine carried five of the largest candles ever made. These measured five feet in height and were mounted on the head end of the locomotive. Passengers on the train celebrated the event with a birthday party in the dining car. The "Blue Comet" made its inaugural run on February 21, 1929. Since then it has completed approximately 3,800 trips, carrying over 500,000 passengers. Although its schedule calls for the completion of the 136-mile trip in exactly three hours, which involves a top speed of 75 miles an hour, the train has a 97 per cent on-time record. It represents one enterprise started in 1929 which is still going strong.

Another Pullman Shoe Story

Everyone has heard the story of the absent-minded Pullman porter who, when confronted with one black and one tan shoe in the hands of an irate passenger, remarked, "That's the second time that's happened this morning." Here is another story of the same sort, and this is vouched for by the Omaha district of the Pullman Company and by the Pullman News. A porter on the "Portland Rose" out of Chicago began the nightly job of shining shoes, but immediately ran into a problem which he called upon the conductor to settle. From beneath lower 4 he had extracted two large shoes, one round-toed with perforated cap and the other square-toed with plain cap. The size and color were the same, but otherwise the shoes were quite unlike. The conductor asked that each pair of men's shoes in the car be brought to him separately, figuring that the mix-up would be automatically straightened out. It is easy to imagine his surprise when the last of 12 pairs was laid before him, for they, too, presented a similar problem. This pair was three sizes smaller than those constituting Problem No. 1, but one was a plain black shoe without cap and the other black, round-toed and with perforated and ridged cap. Not until morning was the situation explained. Then it was discovered that the mismated shoes were the property of two passengers, both of whom had hurriedly changed shoes before leaving home for the train and who were equally unaware of the mismated nature of their footgear until they put them on that morning.

Stationery Conservation

According to William S. Wollner, general safety, fire prevention and welfare agent of the Northwestern Pacific, that railway is glowing with pride at a recent indication of the thriftiness of one of its station agents in the matter of company stationery. On February 6, General Superintendent William N. Neff received a communication from the station agent in an envelope bearing the corner mark of the California Northwestern Railway Company. Indications were that this envelope was one of an order for 10,000, printed on March 15, 1899. The California Northwestern ceased to exist on January 7, 1907, when it was merged with other properties to form the Northwestern Pacific. No one connected with the latter road has any recollection of having seen one of these envelopes for at least 25 years.

"Largest Shipment" on the Way

Steel for the San Francisco-Oakland bridge, representing the largest shipment of its kind ever routed across the country by rail, has started moving from the mills at Pittsburgh, Pa., Chicago and Gary, Ind. More than 40,000 tons of steel are included in the order, and approximately 1,000 cars will be needed to complete the shipment. It is expected that the entire transportation job will require more than nine months. The steel is for use in the towers over the bridge piers and in the cantilever span of the structure. Many of the steel units are of such weight and dimension as to require special handling. The largest

Steel Units for the San Francisco-Oakland Bridge on Arrival at the Southern Pacific Yards in Oakland, Cal.

pieces are 65 ft. long, slightly over 12 ft. high and weigh up to 75 tons. Upon arrival at the storage yard of the Southern Pacific at Oakland, the steel is being unloaded in preparation for at least three months of "weather-curing." After that, the steel will be reloaded on cars, placed on floats and delivered by the Southern Pacific directly to the pier sites.

NEWS

Railways Cite Price Rises in Statement to N. R. A.

Ask consideration of fact that roads cannot readily offset increases by higher rates

Calling attention to an estimated increase of $126,183,000 in the operating expenses of 100 railroads due to increases in the prices of railway materials and supplies since May, 1933, on the basis of the amounts used in 1930, the Association of Railway Executives has filed with the National Recovery Administration a statement earnestly requesting that in its consideration of the various industrial codes "due and careful consideration should be given to the fact that the railroads are enormous purchasers of railway materials and supplies and that they are not at liberty, without approval of public authority, to increase their rates and charges so as to compensate for any increased expenses which may grow out of the operation of the various codes".

The statement points out that the railways are the largest single direct purchasers of the products of certain basic industries and that the N. R. A. program obviously contemplates that where an industry has had its cost of production increased by reduction in hours of labor or increases in rates of pay it shall be permitted to increase its prices to consumers to recoup its losses. The railways are not finding fault with such an understanding, the statement adds, but at the same time they call attention to the fact that, if they are required to pay more for materials and supplies by reason of agreements and codes brought about by the operation of the national industrial recovery act they will not be in a position to increase their prices to compensate for the increase in the amount of their operating expenses.

The N. R. A. has been holding this week and last a series of meetings of members of code authorities and code committees for the purpose, among others, of bringing about a further shortening of hours and increase in wages. In an address before the general meeting on March 5 President Roosevelt said in part: "Every examination I make, and all the information I receive, lead me to the inescapable conclusion that we must now consider immediate co-operation to secure increase in wages and shortening of hours", and that "it is the immediate task of industry to reemploy more people at purchasing wages and to do it now."

Switching Charge Suspended

The Interstate Commerce Commission has suspended from March 6 until October 6 the operation of tariff schedules published by the Sioux City Terminal proposing to increase the switching charge at Sioux City, Iowa, from $5 per car to $6 per car on all traffic except livestock, between connecting lines and industries located on the Sioux City Terminal Railway, whereas the line haul carriers will continue to absorb only $5 per car.

Ohio Valley Board Meeting

The next meeting of the Ohio Valley Transportation Advisory Board will be held in Cincinnati, Ohio, on March 20, at the Hotel Gibson. Among the subjects docketed are: Freight loss and damage prevention; revision of Consolidated Classification Rule 30 relative to dunnage allowances; simplification of publication of tariffs; and a resume of the commodity committee reports forecasting prospective business conditions in the territory.

Railroad Credit Corporation to Make Additional Distribution

The Railroad Credit Corporation will make its sixth liquidating distribution to the participating carriers on March 31, which will bring the total repayments up to $8,890,000, or 12 per cent of the net emergency revenues under Ex Parte No. 103, contributed to the pool administered by the corporation. The distribution now authorized is to be equivalent to 1 per cent of the fund, and will amount to approximately $750,000.

New York Railroad Club Meeting

R. L. Lockwood, director, Section of Purchases, Federal Co-ordinator of Transportation, will speak on Co-ordinating Purchases and Standards at the meeting of the New York Railroad Club on Friday evening, March 16, at 8:00 p. m. The meeting will be held in the Engineering Societies Building, 29 West 39th street, New York City, and the address will be followed by an open forum discussion.

Railway Net for January a Return of 2.16 Per Cent

Gross operating revenues for month were 13.9 per cent greater than last year

The net railway operating income of the Class I railroads in January amounted to $30,931,205, which for that month was at the annual rate of return of 2.16 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics. In January, 1933, their net amounted to $13,585,010 or 0.94 per cent. Operating revenues for January amounted to $258,005,695, compared with $226,555,138 in January, 1933, or an increase of 13.9 per cent. Operating expenses totaled $195,848,887, compared with $181,679,760 in the same month last year, or an increase of 7.8 per cent.

Class I railroads in January paid $20,770,833 in taxes, a reduction of $969,368 or 4.5 per cent below the same month last year.

Thirty-nine Class I railroads operated at a deficit in January, of which 12 were in the Eastern district, 6 in the Southern and 21 in the Western.

The net railway operating income of the in January was $21,140,550, at the rate of 3.11 per cent. For the same month in 1933, their net was $13,748,286 or 2.01 per cent. Operating revenues in the Eastern district in January totaled $135,377,455, an increase of 13.9 per cent over the corresponding period the year before, while operating expenses totaled $98,925,484, an increase of 9.9 per cent.

Class I railroads in the Southern district in January had a net of $5,272,363, at the rate of 2.13 per cent. For the same month in 1933, their net amounted to $3,116,551, at the rate of 1.25 per cent. Operating revenues in the Southern district in January totaled $34,608,161 an increase of 11.2 per cent, while operating expenses totaled $25,789,030, an increase of 5.5 per cent.

Class I railroads in the Western district in January had a net amounting to

CLASS I RAILROADS—UNITED STATES
Month of January

	1934	1933	Per Cent Increase
Total operating revenues	$258,005,695	$226,555,138	13.9
Total operating expenses	195,848,887	181,679,760	7.8
Taxes	20,770,833	21,740,201	4.5 De.
Net railway operating income	30,931,205	13,585,010	127.7
Operating ratio—per cent	75.91	80.19	....
Rate of return on property investment	2.16%	0.94%	....

$4,518,292. In January, 1933, their net deficit was $3,279,827. Operating revenues in the Western district in January totaled $88,020,079, an increase of 14.9 per cent, while operating expenses totaled $71,134,373, an increase of 5.8 per cent.

Senate To Vote on St. Lawrence Treaty

The Senate on March 1 agreed to take a vote on March 14 on the ratification of the St. Lawrence waterway treaty, which has been the subject of intermittent debate for several weeks.

Allegheny Regional Board

The Allegheny Regional Advisory Board will hold its regular annual meeting at Hotel Schenley, Pittsburgh, Pa., on Thursday, March 15. In addition to the usual business, there will be a paper on the St. Lawrence river seaway, by A. S. Boden, traffic manager of the Western Pennsylvania Coal Traffic Bureau.

R. F. C. Loans to Railroads

The monthly report of the Reconstruction Finance Corporation showing the loans made up to the close of business on February 28 shows a total of $402,287,361 of loans advanced to railroads and receivers, out of authorizations totalling $412,345,678, of which $57,082,432 had been repaid.

National Railway Appliances Association

The annual meeting of the National Railway Appliances Association will be held in the offices of the association, 910 South Michigan avenue, Chicago, at 11 a. m. on Monday, March 12. At this meeting reports will be received from officers and the business of the association transacted.

Rock Island Agents to Sell Grace Line Tours

The Chicago, Rock Island & Pacific and the Grace Line have arranged rail-water tours which will be sold by the agents of both companies. These tours provide for transportation from points on the Rock Island to California, thence by steamer through the Panama canal to New York and return by rail to the starting point.

Emergency Board Appointed for D. & H. Dispute

President Roosevelt has appointed an emergency board consisting of W. P. Stacy, H. A. Wiley, and Dr. Walter Hamilton to investigate a labor controversy between the Delaware & Hudson and certain of its employees. The Board will hold its first meeting at Albany, N. Y., on March 15.

Kansas City Southern Strike Order Recalled

An order issued by an executive committee of the railroad brotherhoods on February 28, calling for a strike by all Kansas City Southern trainmen at 6 p. m. on March 1, was recalled pending negotiations between the railway and the brotherhoods. Action by the employees was taken upon receipt of word from Washington that a conference between Charles E. Johnston, president of the road, and Joseph B. Eastman, federal co-ordinator of transportation, on February 28, had resulted in no compromise in the company's dispute with trainmen over a new wage scale and set of working conditions which were to become effective on March 1. Following the issuance of the order calling for a strike, the railway deferred placing its plan into effect until April 1.

Wage Statistics for December

Class I railways, excluding switching and terminal companies, reported to the Interstate Commerce Commission a total of 966,291 employees as of the middle of December, 1933, and a total compensation for the month of $117,618,965. This was a decrease, mainly seasonal, of 3.13 per cent from the number reported for November, and was a decrease of 1.08 per cent as compared with December, 1932. It was also reported that 1,092,060 employees received some pay during the month, either for full time or for part time.

Visitors to U. P. Train

A total of 32,000 persons passed through the Union Pacific high-speed streamlined train when it was on exhibition in Washington, D. C., for 13 hr. on February 16. In other words, 41 persons passed through the train each minute it was on display. When the train was exhibited at Chicago for 28 hr. on February 23-24, a total of 50,222 persons passed through it, or at the rate of 30 per minute.

Correction

In the *Railway Age* of January 27, on page 122, it was incorrectly stated that the Canadian Pacific failed to earn its fixed charges in 1932 and 1933. Net revenue from railway operations was insufficient to cover these charges, but special (net) income from steamships and ancillary enterprises—totaling $4,537,425 in 1932—was sufficient when added to railway income to cover these charges in that year by a margin of $1,007,000, and in 1933 net income exceeded that of 1932.

Southern Pacific Campaign for L. C. L. Business

The Southern Pacific Lines in Texas and Louisiana are conducting an active campaign in Houston, Tex., to regain l. c. l. business. One of the features of the campaign is the distribution of blotters on which specific information is printed to impress upon shippers the relation of the railroad, from the standpoints of payroll and taxes, to the future welfare and progress of the city. The blotters read: "$5,527,818 represents the amount of this company's 1933 payroll to 4,103 officers and employees who reside permanently in Houston. An appreciable number of these men and women own their homes and pay taxes in Houston. $313,620.76 represents our total taxes paid in Harris county in 1933, distributed to various purposes as follows: State, $41,459.82; county, $18,026.01; highways, $20,429.47; schools, $91,107.78; city, $127,736.80; other taxes, $14,860.88."

With the distribution of blotters there are at work 25 teams, composed of a regular freight traffic solicitor and one other employee who are schooled as to the purposes of the business drive, the proper method of approach and the best way of presenting the railroad's claim for patronage. The results thus far are satisfactory, numerous favorable comments and reactions as well as a large number of permanent routing orders having been brought back by the solicitors together with definite promises of the return to the rails of a large amount of l. c. l. tonnage.

Bill to Authorize Electrification in District of Columbia

At the request of the commissioners of the District of Columbia, Senator King and Representative Norton on March 5 introduced bills in Congress to authorize steam railroads to electrify their lines within the District. The bill was introduced because of the electrification program of the Pennsylvania.

Disney on Concrete Design

C. P. Disney, bridge engineer, Central Region, Canadian National Railways, will present a paper on Rigid Frame and Continuous Bridges before the Western Society of Engineers, Chicago, at 7 p. m. on Monday, March 12. In this paper Mr. Disney will describe the considerations leading to the construction of several bridges of advanced design in reinforced concrete on that road. This paper is to be presented on the evening prior to the convening of the convention of the American Railway Engineering Association.

New England Railroad Club

The New England Railroad Club will hold its annual meeting at the Copley-Plaza Hotel, Boston, on Tuesday evening, March 13, with a dinner at 6:30 p. m. This meeting will be the annual election of officers, and the annual reports will be read, but otherwise no business will be done. The feature of the evening will be a showing of motion pictures, provided by the Boston Traveler, the United Fruit Company and the Industrial Film Corporation. The newspaper will give a pictured history of newspaper life for the past 25 years, and the United Fruit Company will show life in Central America and on board ship.

I. C. C. Action in Barge Line Case Sustained

The Supreme Court of the United States, in a decision rendered on March 5, reversed the decision of a lower court which had enjoined the order of the Interstate Commerce Commission requiring the railroads to join with the American Barge Line Company in through routes and joint rates on cotton from Arkansas points and Memphis, Tenn., to eastern territory and southern New England. The railroads had contested the order on the ground that it had been issued without a hearing but the court finds that this was not in violation of the due process clause of the Constitution because the commission concedes that a

full hearing must be accorded before the order becomes effective, if complaint is filed. If the preliminary order be erroneous in any particular, the court said, it is susceptible of correction by the commission upon the hearing thus provided for.

C. & N. W. Labor Dispute Settled

Conferences between employees and management of the Chicago & North Western in progress since February 22 were concluded on March 7 and, according to Fred W. Sargent, president of the railroad, and William Bishop, vice-president of the Brotherhood of Railroad Trainmen who acted as chairman of the meeting, a satisfactory settlement was made of all cases on the strike ballot mailed to employees on February 2. In addition an agreement was reached for the handling of future matters between the employees and the management which should provide for an amicable settlement of any differences that may arise from time to time.

Canadian Roads Show Improvement in January

Gross operating revenues of the all-inclusive Canadian National System for January, were $11,562,577, an increase of $1,838,988 over January, 1933. Due to weather and other uncontrollable factors, operating expenses for the month, which totaled $12,371,543, showed an increase of $740,530 over those of January last year. In January this year the system had a net revenue deficit of $808,966, which was, however, a betterment of $1,098,457 as compared with January, 1933, when there was a net operating revenue deficit of $1,907,423.

The Canadian Pacific had January gross revenues of $8,970,335, an increase of $1,294,674 over the $7,675,660 reported in January a year ago. The month's expenses totaled $8,081,346, against $7,352,288 a year ago, an increase of $729,057, leaving operating net for the month of $888,989, an increase of 565,616 over the $323,372 reported for January a year ago.

Emergency Board Reports on D. & R. G. W. Labor Disputes

The emergency board appointed by President Roosevelt on February 10 to investigate an accumulation of labor grievances, 75 in number, as a result of which the train service employees of the Denver & Rio Grande Western had voted to strike, has submitted a report made public on March 5 that a method of adjustment has been agreed upon for many of the disputes, that there is no cause remaining to justify a strike and that the remaining controversies can be settled as suggested in the report as to many individual cases. The board, of which Frank P. Douglass was chairman, also reported that closer co-operation is needed between the representatives of the carrier and the employees to amicably adjust grievances that should not be prolonged in reaching a settlement; that the board was impressed by the number of cases in which the Western Train Service Board of Adjustment has been deadlocked instead of reaching decisions, and also with the number of cases in which the decisions, due to their lack of clarity, were of such nature as to prolong controversies. It also reported that the numerous cases which had neither been to the train service board for decision nor through mediation or arbitration as provided for by the railway labor act clearly have no proper place in a strike ballot.

P. R. R. Safety Record

The Pennsylvania, in announcing the names of winners in its Safety Contest for the year 1933, issues a statement showing that the record of deaths and injuries of employees averaged for the year 4.2 per million man-hours, the number of men in service being about 110,000. This record represents a constant improvement in safety, year by year, from 1927, when the average was 19.1 per million man-hours. The announcement says that the safety contest will be continued through 1934.

For the purposes of the safety record, the divisions of the road are classified in three groups, A, B, and C, according to the number of man-hours worked, and the different divisions are compared, one with another, to stimulate competition for the best records.

Some of the smaller divisions had perfect records; for example, in the steam locomotive service, the Monongahela, the Toledo and the Indianapolis divisions; in the station department, the Long Island Railroad and seven other divisions.

Report of Default on Van Sweringen Loans Denied

A statement filed with the Federal Trade Commission this week that the Cleveland Terminals Building Company and the Vaness Company were in default on loans of approximately $40,000,000 made by J. P. Morgan & Co., and others, which was made the occasion for newspaper stories to the effect that the bankers had taken over control of the Van Sweringen railroads, was later explained in a statement issued by R. G. Page, vice-president of the Bankers' Trust Company, as erroneous, and it is now stated that the interest on the loans has been funded. The statement was filed with the commission in connection with an application to issue certificates of deposit for bonds of the St. Louis, Iron Mountain & Southern deposited with a protective committee, for the purpose of disclosing, as required by the security registration law, the interests of members of the protective committee. In this connection the Bankers' Trust Company, as Mr. Page was chairman of the committee, reported its participation in a loan of $22,019,932 to the Cleveland Terminals Building Company, and another of $18,100,000 to the Vaness Company, made by J. P. Morgan & Co., and others, which were stated as to "in default." The loans were guaranteed by the Vaness Company and by O. P. and M. J. Van Sweringen, and were secured in part by pledge of stock of the Alleghany Corporation. Later Mr. Page stated that at the date of filing the registration statement the committee was informed that the interest on the two loans was overdue but that he had now learned that the information was incorrect in this respect.

Construction

CHESAPEAKE & OHIO.—Work authorized includes installing 12 tracks in storage yard, pier 12, Newport News, Va. to cost $81,000; nine yard tracks are to be installed at Presque Isle, Toledo, Ohio, to cost $151,350. The company will spend $25,000 representing only the erection of a steel span over its tracks at Walnut street, Ronceverte, W. Va. The State Highway Department of West Virginia, in connection with this improvement, will pay $67,571 for the substructure of this overhead bridge and has given the contract to the Skene Construction Company, Point Pleasant, Ohio.

LEHIGH VALLEY.—A general plan and an estimate of cost of work to be done by this road in connection with the elimination of its Taughannock boulevard crossing in Ithaca, Tompkins county, N. Y., has been approved by the New York Public Service Commission. The estimate of cost for work to be done by the railroad amounts to $29,700. The commission also authorized the Lehigh Valley to do certain work without contract at actual cost not to exceed $18,000 in connection with the elimination of the crossing. See item in *Railway Age* of November 18, 1933, Page 743.

LONG ISLAND.— A general contract has been given by this company to the Faircroft Engineering Corporation, Brooklyn, N. Y. for grade crossing separation work on the Long Island at Amityville, Long Island, N. Y. The work will involve the use of 350 tons of steel.

PENNSYLVANIA.—This company has been ordered by the Public Service Commission of Pennsylvania to reconstruct the bridge carrying Concord avenue over the grade of the single track of the Chester Creek branch of the Pennsylvania in Chester, Delaware county, Pa., at an estimated cost of $29,911. The City of Chester and the County of Delaware each are to pay one-third of the cost of the work.

PENNSYLVANIA-READING SEASHORE LINES.—This road has completed plans for the new terminal at Atlantic City, N. J., on which work is to be started at once. The structure will be of classical architecture with limestone and brick exterior, located at Arkansas and Arctic avenues and will be 161 ft. long, 110 ft. deep and 46 ft. high. There will be a waiting room 80 ft. long by 70 ft. deep and 40 ft. high, in the main or centre portion of the building, and the wings on each side of the waiting room will contain the usual ticket, telegraph and telephone offices, retiring rooms and a restaurant, 40 ft. by 27 ft., on the first floor. The second floors of the two wings will be occupied by railroad offices. The plans also include four tracks which will be served by covered platforms. The general contract has been let to Anthony Miller, Inc., at about $250,000 and the work is to be completed by July 1, 1934. See item in *Railway Age* of November 4, 1933, page 681.

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EARNING POWER

RESTS ON MOTIVE POWER

The increased earning ability of modern motive power justifies the replacement of many thousands of existing locomotives. ● Let earning power be the consideration that governs your choice between repairing old power or buying new locomotives. ● Do not perpetuate old locomotives that will be a drain on increasing revenues.

LIMA
LOCOMOTIVE WORKS
INCORPORATED

LIMA OHIO

Equipment and Supplies

P. W. A. Loans to Railroads

Public Works Administrator H. L. Ickes on March 1 signed a contract with the Illinois Central for a loan of $10,000,000 for the purchase of rails and ties, overhauling equipment, replacing bridges and repairing a tunnel. The Illinois Central will spend $1,437,145 for 21,600 tons of rail, 6,733 tons of fastenings, 248,100 cross ties and other miscellaneous materials, to be laid in about 123 miles of the line.

Laying the rail and ties will provide Illinois Central maintenance of way men with 57,100 man-days of employment, according to the company's estimate, for which they will be paid $183,100, which the Illinois Central will pay out of its own funds.

The company will use another $1,252,100 of the loan for replacing and repairing structures on its right of way.

The Big Clifty viaduct, located near Big Clifty, Ky., will be replaced with a new steel trestle at a cost of $167,000. The approaches to the Cairo bridge across the Ohio river between Cairo, Ill., and East Cairo. Ky., will be renewed at a cost of $870,000. Tunnel No. 3 near Reevesville, Ill., is to be relined with reinforced concrete at a cost of $215,000. The balance of the loan, $7,310,855, will be spent in repairing and overhauling 12,645 freight cars, 184 passenger train cars and 148 locomotives in the company's shops. The company will call 1,480 of its furloughed shopmen back to work almost immediately.

Public Works Administrator Ickes announced on March 2 that a payment of $300,000 had been made to the Lehigh Valley as the first installment on its loan of $2,000,000 for rebuilding 1,000 box cars and 60 locomotives in its shops at Sayre, Pa., and rebuilding 1,000 coal cars in its shops at Packerton, Pa. The company has advised PWA that it will require the balance of the $2,000,000 in monthly installments between now and July to meet payrolls in its shops and to pay for materials purchased.

A previous allotment of $500,000 to the Lehigh Valley for the purchase of 5 new locomotives has been increased to $600,000. The allotment originally made was based on the company's estimates of the probable cost. These locomotives, the P. W. A. announcement says, will be built in the Baldwin plant at Eddystone, Pa., and will furnish 153,000 man-hours of work for employees of the plant.

An allotment of $400,000 to the New York Central will be used by that company to pay its trackmen for laying 37,000 tons of rail and the necessary fastenings. The company will apply for a further loan of approximately $2,200,000 from the blanket allotment of $41,000,000 set aside to finance rail purchases by a number of roads. The company estimates that laying the new rail will create 1,147,000 man-hours of employment.

On March 6 the P. W. A. signed a contract for a loan of $910,000 to the Boston & Maine. Other contracts covering loans with which the Boston & Maine will purchase rails and fastenings and new equipment and also make repairs to its roadway and structures are in course of preparation. (See details elsewhere in these Equipment and Supplies columns.)

Public Works Administrator Ickes on March 7 signed a contract with the Chicago, Milwaukee, St. Paul & Pacific covering a loan of $2,317,000. The Milwaukee will spend $2,066,852 of this money for 20,000 tons of new rail and 25,658 tons of fastenings, install air conditioning equipment in 22 passenger coaches with $136,000 and equip 300 automobile cars with patented loading devices at a cost of $114,531. The loan for building 75 new passenger train cars will be covered by another contract.

The passenger cars—50 coaches and 25 baggage-express cars—will be built in the Milwaukee's shops at Milwaukee, and the company estimates that this job will create 701,025 man-hours of work for its shopmen, spread over a period of four months.

The air-conditioning equipment will be installed at the shops in Milwaukee and will provide an additional 50,000 man-hours of employment for the shopmen there. The automobile loading devices will be manufactured and installed at the plant of the Evans Products Company in Detroit, and it is estimated that making and installing them will create about 90,000 man-hours of employment.

Including this contract, Administrator Ickes has signed contracts covering $150,116,000 of the $199,607,800 allotted for loans to railroad companies. A number of other contracts now are nearing completion, and in a short time the entire amount allotted to railroads to help the recovery of the heavy industries and create additional employment for railroad shop and track forces will be contracted for.

Boston & Maine $7,318,000 Program of Purchases and Improvements

Expenditures of $7,318,000 by the Boston & Maine for purchase of new equipment; for extensive improvements to existing equipment, including air-conditioning of passenger coaches and of dining cars; for installation of new seats in steel coaches now in service; for an extensive rail-laying program; for rock ballasting more of its lines; and for installation of new signals in certain areas is already partly under way. The program provides more than 1,900,000 man hours of labor and wage disbursements of more than $1,306,000.

Purchases under the plan include three 800-horse power Diesel-electric passenger rail motor cars, each capable of hauling 4 trailers; a Diesel-electric switching locomotive, 5 Mountain-type and 5 Pacific-type steam locomotives; 10 air-conditioned passenger coaches; and 21 modern suburban coaches.

Applications for loans to provide the money have been filed with the Public Works Administration. The railroad has agreed to secure the loans with collateral and to pay 4 per cent interest on the money.

The program follows:

For repairs to equipment—$910,000. Loan approved by Public Works Administration, contract signed.

For new rails, etc., $2,230,000. Approved by Public Works Administration, contract now being prepared.

For new equipment, $2,628,000. Details not yet approved by Public Works Administration.

For repairs to roadbed and maintenance, $1,550,000. Details not yet approved by Public Works Administration.

The Boston & Maine was allotted $7,500,000 some time ago, by the Public Works Administration. The various forms of formal applications, details of the proposed use of the money sought in the loans, etc., have been under discussion for some weeks.

Signing of the contract for the first $910,000 of the loans, provided for upwards of 464,000 man hours of labor; upwards of $332,000 wages, and expenditures of approximately $722,000 for materials and supplies. The road will provide out of current earnings the $145,000 difference between the amount of the first portion of the loans and the amount necessary to complete this part of the program.

It will enable the road to proceed immediately with air-conditioning of its passenger coaches now operating on The Flying Yankee, The Pine Tree Limited, and the mid-day express between Boston, Mass., and Portland, Me., and Bangor and Boston. The dining cars used on these trains and on The Minute Man, will also be air-conditioned at once. Ten passenger coaches will have reclining seats installed at once. This work will be done at the shops at Concord, N. H.

The granted loan will also enable the company to continue through this month, the full-time employment program which was commenced in December, at its Billerica and Concord shops, which provides for repairs to locomotives, box cars, coal cars and passenger cars.

Signing of the contract for the second section of the loan amounting to $2,230,000 will provide an additional 123,200 man hours of labor, expenditures of approximately $221,500 in wages, and a little over $2,000,000 for materials. This latter item would include immediate purchase of 30,000 tons of rail to be installed from Greenfield, Mass., to South Ashburnham; from Kennebunk, Me., to Rigby; from Rockingham, N. H., to North Berwick, Me.; from Danbury, N. H., to Gerrish; and from the Saugus River (Mass.) drawbridge to Beverly.

The third section of the loan, amounting to $2,628,000 would mean immediate purchase of the three Diesel-electric rail motor cars, the Diesel-electric switching locomotive, the 10 steam locomotives, the 10 passenger coaches, and 21 modern suburban coaches. The Diesel-electric passenger units would be used in passenger service between Boston and White River Junction; between Boston and Woodsville, N. H., and on the Gloucester branch.

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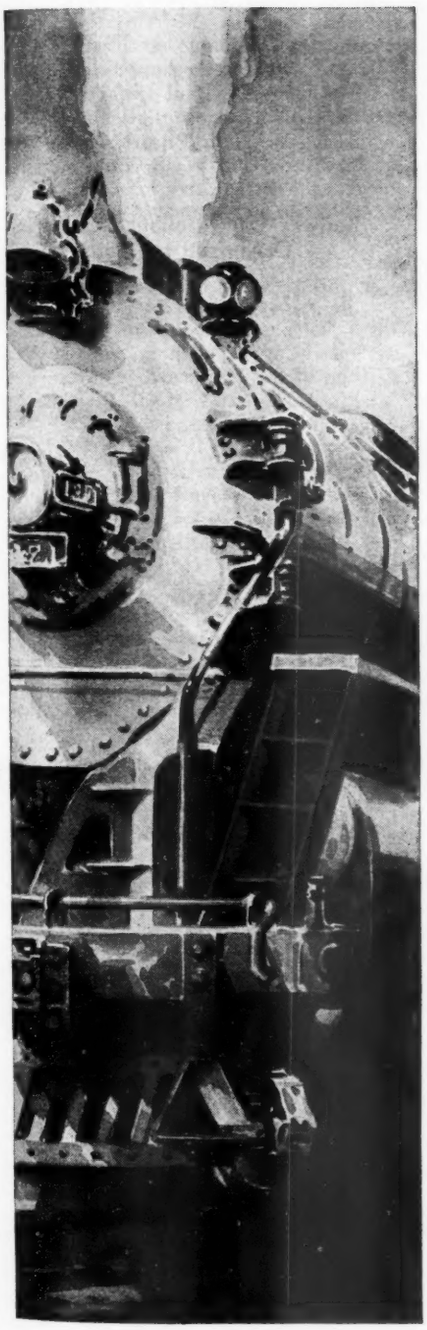
Even the Biggest *Needs the* BOOSTER



The most powerful locomotives ever built, both freight and passenger, employ The Locomotive Booster as a fundamental part of their design.

To be big is no longer enough. Every pound of locomotive weight must be effective—must haul its share of the load.

This calls for The Locomotive Booster to put idle weight to work.

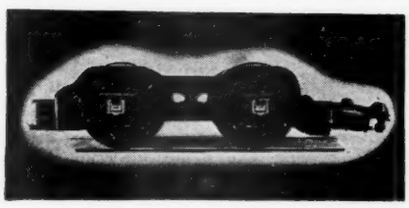
Wherever The Locomotive Booster is applied, economy follows.

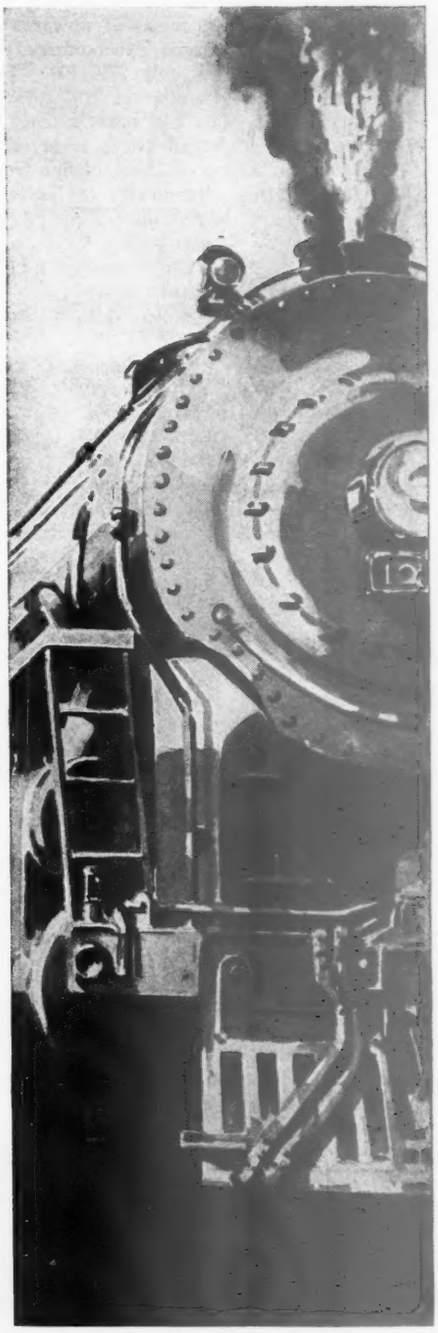
Heavier tonnage or speedier operation—whichever method of operation is chosen, The Locomotive Booster earns large returns.

It supplies the additional power needed to lift a heavy drag over the ruling grade, thereby permitting an increase in rating.

It gets underway the heavy train that a high horse-power locomotive can handle at speed, thereby increasing gross ton-miles per hour.

The Locomotive Booster has established its operating economies on over 70 railroads in this country, Canada, Mexico, Europe, Australia, and South America. It belongs on every new engine.





FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

The five Mountain-type steam locomotives are interchangeable for use in fast passenger and freight service. The five Pacific-type steam locomotives are for passenger service.

The new passenger coaches of the air-conditioned type, would be placed in service on The Minute Man, the State of Maine Express, the Washingtonian, the Montrealer and other through trains.

The loan of $1,550,000, would, when granted, provide over 1,350,000 additional man hours of labor for employees and additional wage disbursements of upwards of $752,800; also additional expenditures for materials of approximately $797,200. The projects include installation on various secondary main lines and branch lines of 8,000 tons of relay rail taken from main lines; rock ballasting of 32 mi. of line from the Saugus River drawbridge to Beverly, Mass.; 13 mi. from Danbury, N. H., to Franklin; resurfacing 90 mi. of rock ballast from Haverhill, Mass., to North Berwick, Me., 42 mi. from Kennebunk, Me., to Rigby, and 38 mi. from Williamstown, Mass., to Johnsonville, N. Y.

It would also permit extension of the system of dispatching and signal equipment in the North Station (Boston) area, by installation of new type signals on the Terminal division and on the Fitchburg division, between Waltham and Fitchburg, together with the consolidation of towers C and D at East Somerville and the towers at Everett Junction, and Medford Junction and consolidation of tower B with the new and modern tower A at Boston. The work on the Fitchburg division would convert interlocking plants to all-electric operation with controls at Gardner, Mass. The plan also includes replacement by color-light signals of the present semaphores from Orange, Mass., to Montague.

FREIGHT CARS

THE ALASKA RAILROAD has ordered 20 hopper bottom coal cars from the Koppel Industrial Car & Equipment Company. Inquiry for this equipment was reported in the *Railway Age* of January 13.

THE UNITED STATES NAVY DEPARTMENT, BUREAU OF SUPPLIES AND ACCOUNTS, Washington, D. C., is asking for bids on March 16, for three steel underframe flat cars and two steel sheathed box cars, all of 50 tons' capacity. These are for service at the Mare Island, Cal., navy yard.

IRON AND STEEL

THE CHICAGO & NORTH WESTERN has ordered 25,000 tons of rails, placing 18,000 tons with the Illinois Steel Company and 7,000 tons with the Inland Steel Company. In addition, the company placed orders for 1,460 tons of joint bars, 4,000 tons of tie plates, 132 sets of compromise joints, 730 tons of track spikes, 180 tons of track bolts, 175,000 special nut locks, 320,000 rail anchors, 100 turnouts, 1,066 insulated joints and 50,000 rail bonds. The companies participating in the latter orders include the Sellers Manufacturing Company, the Bethlehem Steel Company, the Q & C Company, the Du-Wel Steel Products Company, the Youngstown Sheet & Tube Company, the Republic Steel Corporation, the National Lock Washer Company, the Eaton Manufacturing Company, the Beall Tool Company, the Woodings-Verona Tool Works, the P & M Company, the Creepcheck Company, the American Fork & Hoe Company, the Morden Frog & Crossing Works, the Ramapo-Ajax Corporation, the Buda Company, the Rail Joint Company, the American Steel & Wire Company and the Ohio Brass Company.

THE SOUTHERN PACIFIC has ordered 125 tons of structural steel for an overpass at Jolma, Cal., from the American Bridge Company.

THE CHICAGO & EASTERN ILLINOIS has ordered 4,000 tons of rails, placing 800 tons with the Inland Steel Company and 3,200 tons with the Illinois Steel Company.

THE WABASH has ordered 10,000 tons of rails, placing 6,850 tons with the Illinois Steel Company and 3,150 tons with the Inland Steel Company.

SIGNALING

THE INTERBOROUGH RAPID TRANSIT COMPANY, New York City, has bought from the Union Switch & Signal Company materials for the installation of automatic block signals on its Fourth Avenue subway line, from Brooklyn Bridge southward to Bowling Green, and on its Seventh Avenue line, from Chambers Street to South Ferry. These are local sections with stations close together. The order includes 38 three-position color-light signals, 33 electro-pneumatic automatic train stops and other materials.

MISCELLANEOUS

THE CENTRAL OF NEW JERSEY on March 1, recalled 500 employees to its shop at Elizabethport, N. J., for the repair of 259 pieces of rolling equipment.

THE NORFOLK & WESTERN will equip 100 of its all-steel auto box cars with automobile loading and unloading devices. This will permit the loading of four automobiles in a car instead of three.

Pennsylvania Places $1,000,000 Order for Freight Car Specialties

The Pennsylvania has placed orders, aggregating more than $1,000,000 with six companies for specialties used in freight car construction. The orders include metal ends, side doors, power hand brakes and cast steel car under-frames, all of which will be used in construction of the new freight cars now being built in the railroad's shop at Pitcairn, Pa., Altoona and Enola. The firms which shared in the specialty orders, made possible by government co-operation with the railroad, are: The Union Metal Products Company, Chicago; the Camel Sales Company, Chicago; the Youngstown Steel Door Company, Youngstown, Ohio; the General Steel Castings Corporation, Eddystone, Pa.; the Universal Draft Gear Attachment Company, Chicago and the Equipment Specialties Company, Chicago.

Supply Trade

The Westinghouse Air Brake Company and the **Union Switch & Signal Company** will move their New York offices, about May 1, from 150 Broadway to the Empire State building, Fifth avenue and Thirty-third street, New York.

On February 27 the local interests of the **Pacific Car & Foundry Company**, Seattle, Wash., acquired the stock control formerly held by the **American Car & Foundry Company** in that company. Officers of the re-organized company are now as follows: **Paul Pigott,** president; **H. N. Curd,** vice-president and general manager; **William Pigott,** vice-president and treasurer and **W. S. Bassage,** secretary and assistant treasurer.

Railway Car Appliance Industry Organized for Code

In order to carry out the N. R. A. code of the railway car appliances industries, these companies have organized as the Railway Car Appliances Association, a division of the Fabricated Metals Products Manufacturing and Metal Finishing and Metal Coating Industries.

Officers are as follows: President, W. E. Sharp, president of the Grip Nut Company, Chicago; treasurer, Arthur A. Frank, vice-president of the Union Metals Products Company, Chicago; temporary secretary, William H. Winslow, Jr., an attorney; directors, in addition to Mr. Sharp and Mr. Frank, include, A. C. Moore, president, Chicago Railway Equipment Company, Chicago; W. D. Thompson, president, Hutchins Car Roofing Company, Detroit, Mich.; A. D. Bruce, vice-president and secretary, Vapor Car Heating & Lighting Company, Inc., Chicago; W. W. Darrow, vice-president, Camel Sales Company, Chicago; C. D. Jenks, president, Chicago Cleveland Car Roofing Company, Chicago; G. N. DeGuire, assistant to the president, Locomotive Firebox Company, New York; and J. P. McWilliams, president, Youngstown Steel Door Company, Cleveland, Ohio. The Code committee consists of Mr. Sharp, Mr. Moore and Mr. Thompson.

Members of the association are as follows: Ajax Hand Brake Company, Chicago Cleveland Car Roofing Company, Camel Sales Company, Chicago Railway Equipment Company, O. C. Duryea Corporation, Evans Products Company, Enterprise Railway Equipment Company, Grip Nut Company, Gustin-Bacon Manufacturing Company, Gold Car Heating & Lighting Company, Hutchins Car Roofing Company, Illinois Railway Equipment Company, W. H. Miner Company, P. H. Murphy Company, Railway Metal Products Company, Roth Manufacturing Company, Standard Car Truck Company, Standard Railway Equipment Company, Safety Car Heating & Lighting Company, Union Metal Products Company, Union Railway Equipment Company, Vapor Car Heating & Lighting Company, Inc., Western Railway Equipment Company, Youngstown Steel Door Company, Railway Devices Company, Camel Company and Lumber Products Company.

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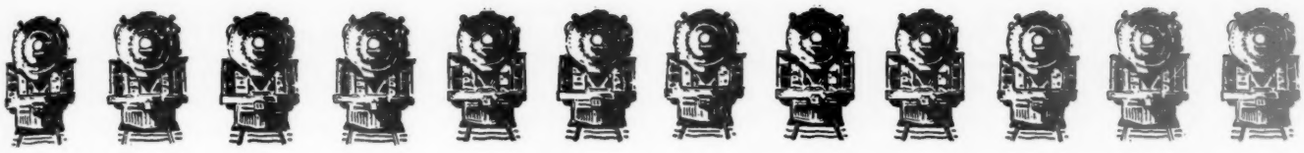
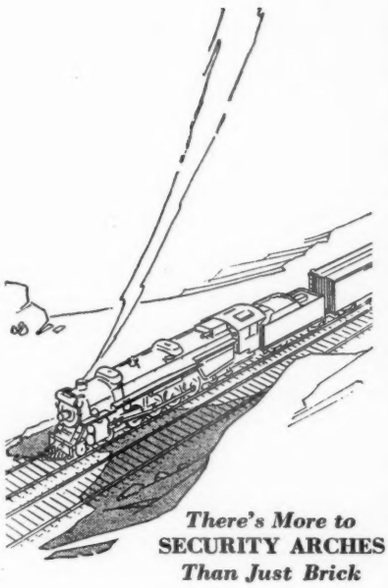
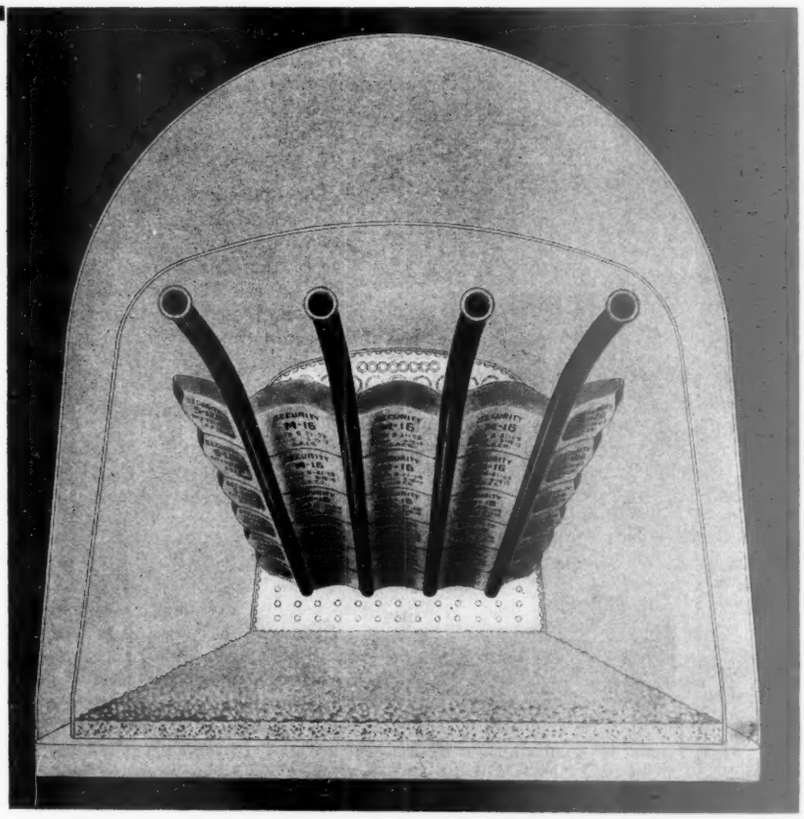


LOCOMOTIVES

Are Asking A Lot From Arches



There's More to
SECURITY ARCHES
Than Just Brick



Where freight trains once plugged along at 15 miles per hour they now speed at 50.

Where 100 miles was one time a district and the end of a day, the locomotive makes 500 miles.

These operating improvements are fine for railroad economy but they are tough on the locomotive arch.

Today the Arch makes its mileage in much shorter time than it did a few years ago, and under far more severe conditions.

Everything considered, Arch Brick render better service today than they ever did — a tribute to the constant efforts of American Arch Company in developing the locomotive Arch.

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

NRA MEMBER U.S. WE DO OUR PART

AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

Financial

AKRON, CANTON & YOUNGSTOWN.—*Annual Report.*—The 1933 annual report of this company, including its subsidiary the Northern Ohio, shows net income of $56,591, as compared with net deficit of $60,125 in 1932. Selected items for the Income Statement follow:

	1933	1932	Increase or Decrease
Average Mileage Operated	171.31	171.31	.....
RAILWAY OPERATING REVENUES	$1,594,629	$1,564,496	+$30,133
Maintenance of way	200,161	190,881	+9,281
Maintenance of equipment	172,381	172,328	+54
Transportation	463,593	480,854	−17,261
TOTAL OPERATING EXPENSES	1,027,380	1,090,780	−63,400
Operating ratio	64.00	69.05	−5.05
NET REVENUE FROM OPERATIONS	574,045	484,274	+89,770
Railway tax accruals	106,793	141,109	−34,316
Hire of freight cars	160,500	140,700	+19,800
NET RAILWAY OPERATING INCOME	322,599	223,110	+99,488
Interest on funded debt	335,956	333,421	+2,535
TOTAL DEDUCTIONS FROM GROSS INCOME	366,199	369,155	−2,957
NET INCOME	$56,591	*$60,125	+$116,717

* Deficit.

ATCHISON, TOPEKA & SANTA FE.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a branch extending from Seward, Okla., to Cashion, 10.6 miles.

ATCHISON, TOPEKA & SANTA FE.—*Abandonment.*—This company and the Oil Field & Santa Fe have applied to the Interstate Commerce Commission for authority to abandon the line between Oilton, Okla., and Jennings, 7.42 miles.

ATCHISON, TOPEKA & SANTA FE—CHICAGO, ROCK ISLAND & PACIFIC.—*Joint Trackage Operation.*—These companies have filed a joint application with the Interstate Commerce Commission for authority to operate over the Union Pacific tracks between Abilene, Kan., and Salina, 19.61 miles, under trackage rights and to construct connecting tracks. The Santa Fe has also applied for authority to abandon a portion of its main line between Abilene and Solomon, 9.77 miles, and the Rock Island has asked authority to abandon its line between Solomon and Salina, 10.14 miles.

BOSTON & MAINE—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon a branch line from Belmont, N. H., to Belmont Junction, 4 miles.

CHICAGO & EASTERN ILLINOIS.—*Notes.*—The Interstate Commerce Commission has authorized the trustees to issue $240,000 of trustees' registered serial certificates in connection with a loan from the P.W.A.

CHICAGO & NORTH WESTERN.—*Notes.*—The Interstate Commerce Commission has authorized this company to issue $1,400,000 of registered serial collateral notes to the P.W.A. in connection with a loan for the purchase of rails and fastenings.

FLORIDA EAST COAST.—*Not Permitted to Abandon Branch.*—The Interstate Commerce Commission has denied the company's application for authority to abandon its 1.8-mile Palatka branch.

FREDERICKSBURG & NORTHERN.—*Note Extension.*—The Interstate Commerce Commission has authorized this company to extend from December 28, 1933, to December 28, 1936, the maturity date of $226,915 of its 5 per cent secured notes.

GREAT NORTHERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line between Kalispell, Mont., and Somers, 9.6 miles, and between Kalispell and Marion, 23 miles.

ILLINOIS CENTRAL.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $10,000,000 of equipment trust certificates covering a loan from the Public Works Administration.

ILLINOIS CENTRAL.—*R. F. C. Loan.*—This company has filed a supplemental application to the Reconstruction Finance Corporation for a loan of $10,000,000, in place of the $15,000,000 for which it applied in December, to meet interest requirements and equipment trust maturities and to provide $5,000,000 toward paying half of the $20,000,000 of three-year 4½ per cent notes maturing on June 1.

LOUISVILLE & NASHVILLE.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a branch extending from Napier Junction, Tenn., to Napier, 11 miles.

PENNSYLVANIA.—*P. W. A. Loan.*—The Interstate Commerce Commission has authorized this company to issue $3,650,000 of 10-year secured 4 per cent serial notes, covering a loan from the Public Works Administration for the purchase of rail, and to pledge as collateral therefor 22,000 shares of Pittsburgh, Cincinnati, Chicago & St. Louis stock and 36,000 shares of Western New York & Pennsylvania stock.

PENNSYLVANIA.—*I. C. C. to Investigate New England Holdings.*—Acting on a complaint filed November 24, 1933, by the governors of the New England states, supported also by petition filed by the city of Boston and the Boston Port Authority alleging violations of the Clayton anti-trust act, the Interstate Commerce Commission has ordered an investigation as to the effect of the holding by the Pennsylvania and the Pennroad Corporation of stock in the Boston & Maine and the New York, New Haven & Hartford. According to the order the investigation is for the purpose of determining whether such holdings may have the effect of substantially lessening competition between the railroads, or of restraining commerce within the New England states, or of tending to create a monopoly of railroad transportation service within the New England states, in violation of the Clayton law; or whether they subject the Boston & Maine or the New Haven or either of them to the control of the Pennsylvania, or to common control with one another; and prevent or hinder the carrying out of any part of the commission's consolidation plan or impair the independence of any of the systems provided for in the plan, in violation of the interstate commerce act as amended by the emergency transportation act last June.

PITTSBURGH & WEST VIRGINIA.—*P. W. A. Loan.*—The Interstate Commerce Commission has approved the expenditure of $331,000, the proceeds of a loan from the Public Works Administration, for the purchase of three locomotives.

ST. LOUIS-SAN FRANCISCO.—*Abandonment.*—The Interstate Commerce Commission has authorized this company and its trustees to abandon a branch extending from Brownwood, Mo., to Zalma, 8.6 miles.

ST. LOUIS-SAN FRANCISCO.—*Equipment Trusts.*—The trustees will shortly purchase at not more than face value the company's equipment trust certificates which matured September 1, in addition to paying arrearages of interest on certain other issues.

SOUTHERN PACIFIC.—*Abandonment.*—The Interstate Commerce Commission has authorized this company and the Central Pacific to abandon a branch extending from Churchill, Nev., to Mound House, 26 miles, but has deferred action on an application for authority to abandon a branch extending from Tonapah Junction, Nev., to Tom, Calif., 76 miles.

WESTERN MARYLAND.—*Bonds.*—The Interstate Commerce Commission has authorized this company to procure the authentication and delivery of $1,776,000 of first and refunding mortgage 5½ per cent, series A, bonds under condition that the company enter into a supplemental indenture with the trustee providing for the creation out of net earnings, before the payment of dividends, of a sinking fund to retire at, or before, maturity such bonds as may hereafter be actually issued under this mortgage.

WILKES & WESTERN.—*Authority to Operate Denied.*—The Interstate Commerce Commission has denied the application of this company for authority to acquire, reconstruct and operate a line extending from North Wilkesboro, N. C., to Darby, 26.5 miles, which is a portion of a line formerly operated by the Watauga & Yadkin River, which has not been in operation since 1919.

Dividends Declared

Alabama & Vicksburg.—$3.00, semi-annually, payable April 2 to holders of record March 9.

Boston & Albany.—$2.00, payable March 31 to holders of record February 28.

Chesapeake & Ohio.—$100 Par Common, $2.80, payable April 2 to holders of record March 8.

Reading.—2nd Preferred, 50c, quarterly, payable April 12 to holders of record March 22.

Average Prices of Stocks and of Bonds

	Mar. 6	Last week	Last year
Average price of 20 representative railway stocks..	46.36	45.62	....*
Average price of 20 representative railway bonds..	77.73	77.34	....*

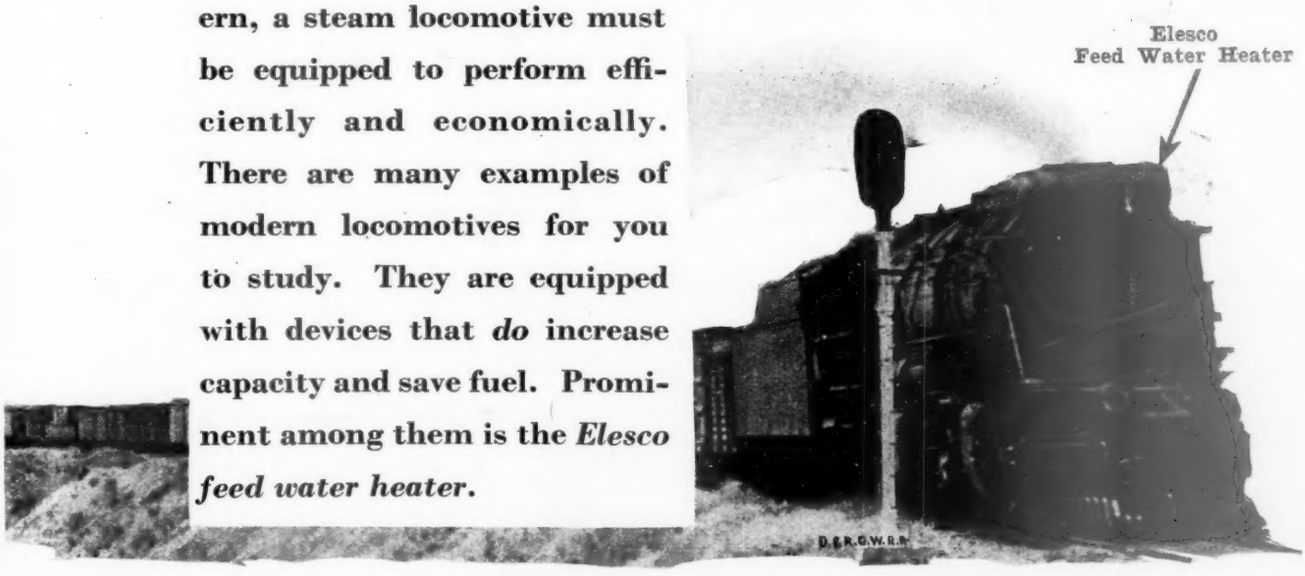
* Exchange closed because of Bank Holiday.

Continued on next left-hand page

Getting Down to BRASS Tacks

There is no type of rail motive power that can compare with a thoroughly modern steam locomotive for work done at the drawbar — on a cost per-pound-weight and cost per-mile-upkeep basis.

BUT, to be thoroughly modern, a steam locomotive must be equipped to perform efficiently and economically. There are many examples of modern locomotives for you to study. They are equipped with devices that *do* increase capacity and save fuel. Prominent among them is the *Elesco feed water heater*.



THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, Inc.

60 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

A-849

Canada: The Superheater Company, Limited, Montreal

Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheated Steam Pyrometers - American Throttles

Railway Officers

EXECUTIVE

W. E. Fowler, assistant to the president of the Montour, has been elected vice-president, with headquarters as before at Pittsburgh, Pa.

FINANCIAL, LEGAL AND ACCOUNTING

S. L. Porter, auditor of the Chicago, Burlington & Quincy, with headquarters at Chicago, has had his title changed to assistant general auditor.

P. M. Gatch, general claim agent for the Illinois Central at Chicago, has had his title changed to general claims attorney. **S. M. Copp** and **E. W. Sprague,** assistant general claim agents, with headquarters at Chicago and Memphis, Tenn., respectively, have had their titles changed to general claim agent.

Albert Ward and **Joseph F. Eshelman,** assistant general solicitors for the Pennsylvania, with headquarters at Phila-

Albert Ward

delphia, Pa., and **Guernsey Orcutt,** assistant general solicitor, with headquarters at Pittsburgh, Pa., have been promoted to assistant general counsel, with headquarters as before at Philadelphia and Pittsburgh, respectively. Albert Ward was born in Washington, D. C., in 1891. He was graduated from the Georgetown University Law School and appointed law clerk in the Department of Justice in 1917. The following year he became secretary to Hon. John W. Davis, solicitor general, on a special mission to Europe. From 1920 to 1923, Mr. Ward was attorney for the director general of railroads, afterwards handling special legal work for the federal government in connection with certain cases growing out of federal control of the railroads. Mr. Ward was appointed assistant general solicitor for the Pennsylvania in March, 1925, and served in that position continuously until his recent promotion.

Joseph F. Eshelman was born in Harland, Ia., in 1891. He was graduated from the College of Law of the University of Southern California in 1917 and after practising law for a time in Los Angeles, Cal., he became associated with the Interstate

Joseph F. Eshelman

Commerce Commission, being appointed an examiner in 1920. During this period he attended the Georgetown University Law School from which institution he received the degrees of Master of Laws and Master of Patent Laws. Mr. Eshelman remained with the Commission as examiner until August, 1926, when he entered the service of the Pennsylvania as assistant general solicitor, the position he held at the time of his recent promotion.

Guernsey Orcutt was born in Chamberlain, S. D., in 1888. He was graduated from Beloit College, Beloit, Wis., and from the Chicago-Kent College of Law. From 1913 to 1918, Mr. Orcutt was associated with the law firm of Loesch, Scofield & Loesch, Chicago, solicitors for the Pennsylvania. In 1918 he enlisted as a cadet pilot in the air service of the United States Army and at the close of the World War he resumed his legal connections at Chicago. In April, 1919, Mr. Orcutt became assistant general solicitor on the Western lines of the Pennsylvania, under the United States Railroad Ad-

Guernsey Orcutt

ministration, with headquarters at Pittsburgh. Upon the termination of Federal control in March, 1920, Mr. Orcutt entered the corporate service of the Pennsylvania in the same capacity and served in that position until his promotion to assistant general counsel.

OPERATING

H. A. Parish, assistant to the general manager in charge of safety of the Chicago & North Western, with headquarters at Chicago, has been appointed superintendent of the Iowa division, with headquarters at Boone, Iowa succeeding **E. L. Henry. C. H. Longman,** a trainmaster on the Wisconsin division at Chicago, has been promoted to assistant to the general manager in charge of safety, to succeed Mr. Parish.

George Washington Adams, who has been appointed superintendent of the Georgia, Southern & Florida (part of Southern Railway System) at Macon, Ga., as reported in the *Railway Age* of February 17, was born on January 4, 1883, at Juliette, Ga. He was educated in the public schools and entered railroad service with the Southern in August, 1900, serving consecutively as agent-operator, telegrapher, dispatcher, night dispatcher, chief dispatcher, trainmaster and assistant superintendent, the position he held at the time of his recent promotion, which became effective February 10.

Walter Pratt, general manager of sleeping, dining and parlor cars and hotels, of the Canadian National, with headquarters at Montreal, Que., has retired from the service of that road, effective March 2. **Joseph Van Wyck,** who was formerly manager of the Chateau Laurier Hotel at Ottawa and assistant general manager of hotels of the National System, has been appointed general manager of hotels, with headquarters at the Chateau Laurier Hotel, Ottawa, and **W. W. Swinden,** assistant to the general superintendent of sleeping, dining and parlor cars, has been appointed general superintendent of sleeping, dining and parlor car services, with headquarters as before at Montreal. Mr. Pratt was born at Sibbertoft, Northamptonshire, England, in 1869. He was educated in the public and grammar schools of Stratford-on-Avon and came to Canada in 1884. He secured his first railway position in that same year as junior clerk in the audit department of the Canadian Pacific at Winnipeg. Three years later he was appointed chief clerk in the purchasing department of the same road and in 1890 he became accountant in the sleeping and dining car department. Mr. Pratt was appointed assistant superintendent of sleeping and dining cars and hotels for the C. P. R., western lines, in October, 1898, continuing in that capacity until 1903, when he accepted a position as superintendent of sleeping and dining cars and news service with the Canadian Northern at Winnipeg. In 1911 Mr. Pratt's jurisdiction was enlarged to cover hotels and in February, 1915, he was appointed general superintendent of those allied services. In 1919 he became manager of the sleeping, dining and parlor car, hotel and news department of the Canadian National

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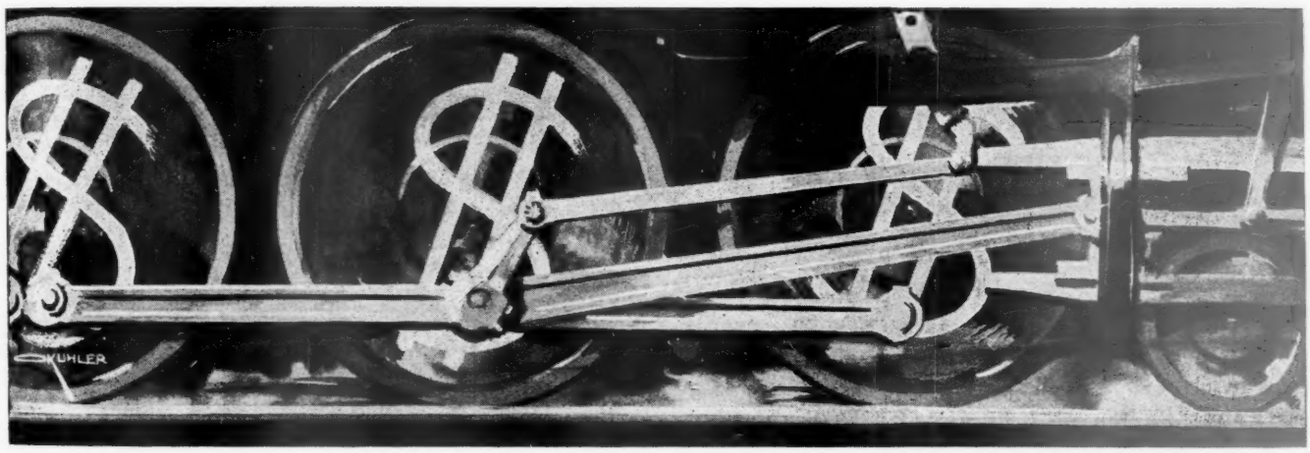
DOLLARS AND DRIVERS



AMERICAN LOCOMOTIVE COMPANY

"It is the rule rather than the exception for delivery between shippers and consignees 200 or 300 miles apart to be demanded in time for the opening of business on the following day. The carrier which can perform this service generally gets the traffic. The motor truck can and does perform this task readily. . . . 73% of all tonnage which moves by truck, according to the statements of shippers, does so partly because that service is faster than railway service. . . . It is this speed which railways must match or exceed if their efforts toward freight traffic recovery and traffic development are to attain their goal."

(*Railway Age — December 23, 1933*)

Freight traffic at its peak amounted to nearly 5 billions of dollars. Last year it approximated 2½ billions. At all times it is by far the main and most important source of railroad revenue. And it seems that speed is becoming a very influential factor in this traffic also.

So why not take inventory — count up the number of freight locomotives you have that have 69 inch drivers or over? It will give you a line on your position from a competitive standpoint in your most essential field. For no matter how you look at it — whether it is a question of handling your traffic in the most economical way — of retaining the traffic that you already have — or of regaining some of the traffic you have lost — one big fact should be kept in mind.

Within certain limits, dollars and drivers grow together — the larger the one, the larger the other.

30 CHURCH STREET · NEW YORK · N·Y·

(which included the Canadian Northern) at Toronto. When these lines were absorbed by the National System in 1923, Mr. Pratt was appointed general manager of the sleeping, dining and parlor car and restaurant department of the system, with headquarters at Montreal, and in 1924 his duties were extended to include also the hotels of the system.

Joseph Van Wyck was born in Amsterdam, Holland, coming to Canada in 1913, and is a naturalized British subject. He joined the Grand Trunk Pacific Hotel department in 1913, subsequently assisting in the opening of the Ft. Garry Hotel at Winnipeg and, in 1915, became assistant manager of the Vancouver hotel. He returned to the Canadian National in 1918, serving until 1926 as manager of various hotels connected with the system. On the latter date he became manager of the Chateau Laurier hotel at Ottawa and since 1926 he has also served as assistant general manager of hotels for the National system.

W. W. Swinden started his railway career as clerk in the sleeping and dining car department in 1907. He subsequently served as chief clerk and acountant in the same department from 1909 until 1919 and in a similar capacity at Toronto until 1923. On the latter date Mr. Swinden was appointed assistant to the general superintendent of sleeping, dining and parlor cars for the Canadian National System at Montreal, in which position he served until his recent promotion.

TRAFFIC

R. J. McMillan has been appointed general agent for the Pittsburgh & West Virginia, with headquarters at Indianapolis, Ind.

William H. Jones, assistant general freight agent of the Chicago & North Western at Chicago, has retired after 45 years of service with this company.

D. H. Hutchinson, assistant general freight agent of the Peoria & Eastern, at Indianapolis, Ind., has been promoted to general freight agent with the same headquarters.

R. G. Robinson, assistant superintendent of dining car service, on the Pennsylvania with headquarters in Long Island City, N. Y., has been appointed superintendent of dining car service, with the same headquarters, to succeed **C. E. Milliron,** deceased.

ENGINEERING AND SIGNALING

F. L. Chatten, assistant supervisor of telegraph and signals on the Maryland division of the Pennsylvania, with headquarters at Wilmington, Del., has been appointed electrical engineer.

PURCHASES AND STORES

William S. Morehead, who has been appointed general storekeeper of the Illinois Central, as noted in the *Railway Age* of March 3, has been connected with this company for 32 years. He was born at Bowling Green, Ky., and entered the service of the Illinois Central in 1902, in the office of the roadmaster at Water Valley, Miss. Two years later he was sent to New Orleans, La., as chief clerk to the roadmaster, being transferred to Nashville, Tenn., in 1905. Mr. Morehead was appointed assistant chief clerk to the superintendent at McComb, Miss., in June, 1907, and in the following year he was advanced to division storekeeper at the same point. In 1913 he was further promoted to assistant general storekeeper at Memphis, Tenn., being transferred to Chicago in 1917 where he remained until his recent promotion to general storekeeper.

William S. Morehead

OBITUARY

Ernest R. Bissell, who retired in 1933 as assistant to the general manager of the New York Central, Lines West of Buffalo, died on February 25 at his home at Hillsdale, Mich. Mr. Bissell was born on May 11, 1872, at Tyner, Ind., and entered railway service in 1886 as a messenger on the Pittsburgh, Ft. Wayne & Chicago (now the Pennsylvania), holding various clerical and other positions on a number of roads until 1892, when he was appointed a dispatcher on the Lake Erie & Western (now part of the New York, Chicago & St. Louis). Five years later he was advanced to chief dispatcher and in 1898 he was made general yardmaster. Mr. Bissell then served successively as a car distributor on the Atchison, Topeka & Santa Fe, as general yardmaster and conductor on the Lake Erie & Western, as general yardmaster on the Chicago, Rock Island & Pacific, as general yardmaster on the Cincinnati, Hamilton & Dayton (now part of the Baltimore & Ohio), and as chief dispatcher and trainmaster on the L. E. & W. In 1906 he was appointed division superintendent with the latter company and in 1911 he went with the Lake Shore & Michigan Southern (now part of the N. Y. C.) as assistant superintendent. In 1914 he was advanced to division superintendent at Detroit, Mich., then going with the New York Central in the following year in the same capacity. From 1918 to 1920 he served as terminal manager at Cleveland, Ohio, for the United States Railroad Administration, and in the latter year he returned to the N. Y. C. as superintendent at Hillsdale, Mich. In 1931 he was appointed assistant to the general manager with the same headquarters, holding this position until his retirement last year.

E. P. Walsh, division storekeeper on the Chicago & North Western, with headquarters at Huron, S. D., died in that city on March 4. He had been ill with double pneumonia.

* * * *

Wilse, Oslo

Mid-Winter at Finse, on the Bergen-Oslo Line of the Norwegian State Railways

Tables of Revenues and Expenses of Railways begin on next left-hand page

SHOCK TOUGHNESS!

– a quality possessed by

AGATHON STAYBOLT IRON

Once a crack starts in a staybolt, how fast will it spread? This is a prime measure of the ability of a staybolt material. « « « This was one of the considerations that governed Republic metallurgists in developing Agathon Staybolt materials. « « « These materials have the shock toughness and high yield point that mean greater safety and fewer staybolt failures, either sudden or slowly progressive. « « « By research over a period of many years Republic metallurgists have thrown much light on the subject of staybolts. This information has been gathered into a booklet, "The Staybolt Question" and is available to anyone interested. « « « This study of staybolts and development of staybolt material has made Republic the preferred source of supply for longer-lived staybolts.

Toncan Iron Boiler Tubes, Pipe, Plates, Culverts, Rivets, Tender Plates and Firebox Sheets • Sheets and Strip for special railroad purposes • Agathon Alloy Steels for Locomotive Parts • Agathon Engine Bolt Steel • Agathon Iron for pins and bushings • Agathon Staybolt Iron • Climax Steel Staybolts • Upson Bolts and Nuts • Track Material, Maney Guard Rail Assemblies • Enduro Stainless Steel for dining car equipment, for refrigeration cars and for firebox sheets • Agathon Nickel Forging Steel.

CENTRAL ALLOY DIVISION, MASSILLON, OHIO

AGATHON NICKEL IRON

REPUBLIC STEEL
CORPORATION
GENERAL OFFICES YOUNGSTOWN, OHIO

AGATHON STEELS

Revenues and Expenses of Railways

MONTH OF JANUARY OF CALENDAR YEAR 1934

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net ry. operating income, 1933
Akron, Canton & Youngstown	Jan.	171	$122,586	$47	$130,065	$14,359	$12,108	$8,033	$42,622	$7,616	$84,738	65.2	$45,327	$35,354	$21,995	$12,542
Alton	Jan.	950	686,241	127,950	954,828	84,075	125,629	44,233	424,710	67,956	758,375	79.4	196,453	126,062	—2,612	—46,338
Alton & Southern	Jan.		Switching and Terminal Company—Will not file beginning January, 1934.													
Atchison, Topeka & Santa Fe	Jan.	9,551	5,770,236	906,433	7,377,782	787,507	2,022,978	304,650	2,900,861	369,910	6,392,197	86.6	985,585	186,032	241,308	—120,422
Gulf, Colorado & Santa Fe	Jan.	1,918	782,359	43,558	897,715	144,530	257,227	48,456	373,742	61,711	885,550	98.6	12,165	—70,246	—160,232	—40,516
Panhandle & Santa Fe	Jan.	1,878	548,737	24,235	622,412	62,354	152,822	16,984	200,581	30,428	463,169	74.4	159,243	114,900	36,679	22,605
Atlanta & West Point	Jan.	93	79,925	16,734	114,532	16,023	24,412	7,284	49,160	7,046	105,878	92.5	8,654	1,452	—9,959	—30,706
Western of Alabama	Jan.	133	84,247	17,469	115,879	17,910	30,065	7,020	44,410	7,743	108,752	93.9	7,127	—893	4,258	—2,205
Atlanta, Birmingham & Coast	Jan.	639	203,864	4,123	235,577	39,086	55,631	21,349	96,127	16,026	237,786	100.9	—2,209	—14,797	—28,700	—38,856
Atlantic Coast Line	Jan.	5,145	2,923,678	550,077	3,917,357	425,347	654,704	141,140	1,362,255	136,078	2,762,841	70.5	1,154,516	754,382	652,435	536,116
Charleston & Western Carolina	Jan.	342	165,464	996	170,587	22,572	23,697	5,542	54,878	4,848	111,537	65.4	59,050	42,550	39,670	17,545
Baltimore & Ohio	Jan.	6,384	9,171,519	765,716	10,600,011	845,721	2,623,710	359,028	3,976,788	550,881	8,438,616	79.6	2,161,395	1,472,814	1,224,911	1,571,507
Baltimore & Ohio Chicago Terminal	Jan.		Switching and Terminal Company—Will not file beginning January, 1934.													
Staten Island Rapid Transit	Jan.	23	54,694	81,125	142,808	5,303	12,993	1,424	82,193	13,027	114,940	80.5	27,868	12,611	—5,676	—5,624
Bangor & Aroostook	Jan.	603	612,821	36,154	669,314	95,455	94,075	4,346	160,663	24,220	379,449	56.7	289,865	239,442	214,341	211,659
Belt Railway Company of Chicago	Jan.		Switching and Terminal Company—Will not file beginning January, 1934.													
Bessemer & Lake Erie	Jan.	225	299,541	955	308,166	40,684	258,642	11,086	111,279	34,830	456,399	148.1	—148,233	—155,394	—141,709	—103,049
Boston & Maine	Jan.	2,081	2,536,528	613,158	3,632,503	366,861	744,749	58,516	1,513,271	170,934	2,864,564	78.9	767,939	584,862	406,465	234,468
Brooklyn Eastern District Terminal	Jan.		Switching and Terminal Company—Will not file beginning January, 1934.													
Burlington-Rock Island	Jan.	280	69,078	814	73,995	9,058	13,002	3,246	39,483	7,600	72,389	97.8	1,606	—3,204	—13,891	—11,194
Cambria & Indiana	Jan.	37	100,085	.....	100,278	6,227	35,437	430	12,399	7,528	62,021	61.85	38,257	20,576	97,307	104,958
Canadian Pacific Lines in Maine	Jan.	233	199,619	14,937	222,814	25,702	37,599	9,890	84,079	6,543	163,813	73.5	59,001	52,001	29,615	22,967
Canadian Pacific Lines in Vermont	Jan.	85	59,438	12,081	83,416	13,283	19,888	4,404	54,770	4,153	96,498	115.7	—13,082	—18,182	—34,209	—50,855
Central of Georgia	Jan.	1,926	851,310	87,543	1,065,709	107,508	252,497	49,921	426,679	68,416	909,921	85.4	155,788	81,607	43,017	—108,184
Central New Jersey	Jan.	689	2,031,032	342,611	2,512,920	108,973	368,307	40,825	972,270	91,077	1,595,073	63.5	917,847	763,450	674,214	288,075
Central Vermont	Jan.	455	333,174	48,700	420,635	58,999	94,412	13,793	204,314	20,148	391,693	93.1	28,942	13,012	4,064	—12,561
Chesapeake & Ohio	Jan.	3,121	8,131,051	192,510	8,576,497	901,964	1,675,286	157,375	1,958,102	277,714	4,983,221	58.1	3,593,276	2,725,616	2,679,268	2,335,978
Chicago & Eastern Illinois	Jan.	938	834,196	82,559	1,023,293	121,087	184,991	50,147	434,696	57,494	854,441	83.5	168,852	73,797	—41,099	—139,939
Chicago & Illinois Midland	Jan.	131	263,142	1,055	272,096	25,858	55,772	15,030	69,658	15,936	182,254	67.0	89,842	78,632	79,074	20,137
Chicago & North Western	Jan.	8,442	4,506,341	598,186	5,752,943	522,080	1,226,572	143,974	2,416,491	271,982	4,610,061	80.1	1,142,882	590,977	420,484	—413,676
Chicago, Burlington & Quincy	Jan.	9,183	5,090,158	462,222	6,214,146	492,803	1,059,656	187,253	2,363,164	296,888	4,442,275	71.5	1,771,871	1,182,102	909,163	120,841
Chicago Great Western	Jan.	1,518	1,050,197	35,271	1,157,494	152,988	186,523	53,921	478,178	47,796	919,652	79.5	237,842	183,464	—10,702	—107,305
Chicago, Indianapolis & Louisville	Jan.	644	492,033	40,721	602,123	44,000	140,000	24,000	255,000	23,000	491,000	81.5	111,123	75,123	—12,877	—90,599
Chicago, Milwaukee, St. Paul & Pacific	Jan.	11,201	5,820,100	346,526	6,811,353	663,380	1,386,454	192,081	2,802,475	255,540	5,333,427	78.3	1,477,926	880,375	423,712	—319,468
Chicago River & Indiana	Jan.		Switching and Terminal Company—Will not file beginning January, 1934.													
Chicago, Rock Island & Pacific	Jan.	7,610	4,077,183	429,840	5,033,226	475,387	1,073,935	171,093	2,126,717	284,978	4,187,371	83.2	845,855	431,386	160,260	—159,560
Chicago, Rock Island & Gulf	Jan.	721	283,079	18,495	303,093	30,263	44,324	15,369	108,625	17,314	218,250	72.0	84,843	63,486	3,668	—20,927
Chicago, St. Paul, Minn. & Omaha	Jan.	1,663	1,016,855	91,816	1,193,449	98,331	194,871	30,636	567,637	66,129	964,977	80.9	228,472	150,133	88,968	—114,618
Cincinnati Union Terminal	Jan.		Switching and Terminal Company—Will not file beginning January, 1934.													
Clinchfield Railroad	Jan.	309	470,170	2,568	477,651	56,353	96,580	15,032	78,826	13,617	260,408	54.5	217,243	177,234	200,158	144,219
Colorado & Southern	Jan.	1,029	356,008	22,194	422,470	40,176	92,038	10,765	169,853	33,730	346,957	82.1	75,513	19,191	1,769	—44,047
Fort Worth & Denver City	Jan.	804	353,988	33,603	444,227	30,163	72,309	15,690	137,890	33,169	290,559	65.4	153,668	123,251	89,432	90,861
Columbus & Greenville	Jan.	167	64,709	5,212	74,968	11,752	11,090	2,969	32,659	9,538	68,008	90.7	6,960	4,455	2,899	—9,945
Conemaugh & Black Lick	Jan.		Switching and Terminal Company—Will not file beginning January, 1934.													
Delaware & Hudson	Jan.	848	1,954,435	103,004	2,146,843	302,780	562,014	47,627	809,084	134,447	1,857,387	86.5	289,456	219,342	236,894	—204,973
Delaware, Lackawanna & Western	Jan.	998	2,612,027	531,057	3,573,170	253,092	813,221	106,669	1,723,550	158,256	3,083,396	86.3	489,774	139,162	104,765	—53,778
Denver & Rio Grande Western	Jan.	2,469	1,327,491	55,426	1,458,539	122,910	298,810	44,518	454,172	74,462	997,790	68.4	460,749	310,743	305,767	129,497
Denver & Salt Lake	Jan.	232	112,123	3,447	126,121	14,016	19,709	1,648	25,176	10,343	70,892	56.2	55,229	41,202	44,526	25,181
Detroit & Mackinac	Jan.	242	33,542	2,995	41,336	8,050	6,281	973	21,274	3,645	40,223	97.3	1,113	—3,545	—5,144	—13,766
Detroit & Toledo Shore Line	Jan.	50	301,999	.....	303,439	16,988	21,138	6,381	67,871	6,453	118,831	39.2	184,608	154,153	99,758	75,352
Detroit Terminal	Jan.		Switching and Terminal Company—Will not file beginning January, 1934.													
Detroit, Toledo & Ironton	Jan.	472	554,088	284	570,553	43,322	65,257	10,274	119,379	16,167	250,838	44.0	319,715	263,705	234,735	71,505
Duluth, Missabe & Northern	Jan.	563	66,244	1,986	85,254	93,860	200,996	3,160	125,989	37,479	461,474	541.3	—376,220	—387,539	—392,061	—319,827
Duluth, Winnipeg & Pacific	Jan.	178	64,543	1,859	69,103	13,206	16,624	1,623	36,487	6,615	74,588	107.9	—5,485	—9,042	1,479	—6,955

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Revenues and Expenses of Railways

MONTH OF JANUARY OF CALENDAR YEAR 1934—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of—Way and structures	Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net ry. operating income, 1933
Elgin, Joliet & Eastern	Jan.	446	$664,330	.....	$717,507	$80,529	$204,866	$12,362	$309,552	$43,109	$650,369	90.6	$67,138	—$12,530	—$49,381	—$89,196
Erie Railroad	Jan.	2,045	4,459,643	$393,632	5,256,678	394,396	1,119,852	136,187	1,972,122	243,831	3,878,621	73.8	1,378,057	1,074,209	1,031,668	513,828
Chicago & Erie	Jan.	269	681,241	9,329	745,539	61,774	89,008	22,745	197,078	33,559	403,935	54.2	341,604	308,995	62,449	37,048
New Jersey & New York	Jan.	45	18,953	58,151	79,217	6,572	25,515	1,246	58,807	3,761	95,901	121.1	—16,684	—20,834	—37,878	—25,405
New York, Susquehanna & Western	Jan.	131	252,862	27,706	297,917	19,957	55,506	4,537	120,509	11,484	211,993	71.2	85,924	62,895	48,126	8,695
Florida East Coast	Jan.	839	549,934	198,711	852,325	111,685	143,388	21,569	221,964	40,740	548,405	64.3	303,920	228,609	181,201	154,116
Fort Smith & Western	Jan.	249	57,446	1,097	63,221	13,217	11,185	5,049	19,833	4,136	52,118	82.4	11,103	8,893	4,315	—1,389
Galveston Wharf	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
Georgia Railroad	Jan.	329	230,291	11,196	262,615	24,800	58,187	16,438	109,098	13,614	222,420	84.7	40,195	34,920	40,554	29,330
Georgia & Florida	Jan.	465	77,402	1,616	83,758	19,583	17,827	7,118	33,310	5,433	83,401	99.6	357	—4,960	—8,767	—25,441
Grand Trunk Western	Jan.	1,008	1,168,463	58,918	1,325,066	143,628	302,296	28,214	601,910	78,922	1,158,685	87.4	166,381	85,218	—36,652	—78,274
Canadian Nat'l Lines in New Eng.	Jan.	172	68,710	6,459	82,439	25,878	18,386	2,369	60,484	8,718	116,534	141.4	—34,095	—46,701	—85,832	—67,486
Great Northern	Jan.	8,361	3,460,293	278,361	4,135,273	413,084	977,713	158,578	1,803,765	201,385	3,602,642	87.1	532,631	—38,735	—215,834	—516,413
Green Bay & Western	Jan.	234	81,261	1,101	86,149	15,927	18,977	4,917	42,371	2,665	84,849	98.4	1,300	—4,269	—5,923	836
Gulf & Ship Island	Jan.	273	73,670	5,246	92,909	15,278	12,845	2,128	48,488	6,184	84,995	91.5	7,914	—7,359	—17,216	—22,626
Gulf, Mobile & Northern	Jan.	961	381,274	14,870	415,001	49,516	55,378	35,206	130,048	22,625	292,773	70.55	122,228	91,228	41,389	—477
Illinois Central	Jan.	5,011	4,983,290	626,159	6,074,424	389,998	1,304,920	160,777	2,391,165	324,413	4,598,997	75.7	1,475,427	1,033,228	872,944	582,930
Yazoo & Mississippi Valley	Jan.	1,658	794,444	52,824	915,626	57,878	144,441	20,854	417,100	49,634	690,660	75.4	224,966	113,179	10,126	27,379
Illinois Central System	Jan.	6,670	5,777,734	678,983	6,990,050	447,876	1,449,361	181,631	2,808,265	374,047	5,289,657	75.7	1,700,393	1,146,407	883,070	610,309
Illinois Terminal	Jan.	525	334,682	52,809	401,764	38,945	58,453	14,798	147,983	15,375	275,449	68.56	126,315	103,249	71,039	29,866
Kansas City Southern	Jan.	783	581,862	12,810	675,726	64,887	119,845	40,772	222,406	59,933	508,713	75.3	167,013	110,029	98,746	60,391
Texarkana & Fort Smith	Jan.	98	62,529	995	74,898	7,717	5,104	5,701	26,056	8,999	53,847	71.9	21,051	14,670	—4,556	—4,556
Kansas, Oklahoma & Gulf	Jan.	326	141,944	424	144,827	7,624	8,203	7,051	37,100	8,200	68,085	47.0	76,742	63,029	48,442	42,800
Lake Superior & Ishpeming	Jan.	160	29,186	136	31,213	18,527	23,744	528	19,241	5,733	67,773	217.1	—36,560	—49,829	—52,128	—35,682
Lake Terminal	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
Lehigh & Hudson River	Jan.	96	124,349	356	130,131	13,796	21,818	3,083	43,216	6,267	88,180	67.8	41,951	30,010	17,406	11,659
Lehigh & New England	Jan.	227	322,135	513	324,898	24,134	70,347	5,366	102,933	14,961	217,741	67.0	107,157	91,972	86,998	—2,664
Lehigh Valley	Jan.	1,353	3,170,537	181,127	3,585,371	210,250	682,128	109,702	1,500,717	125,977	2,643,415	73.7	941,956	746,284	620,802	—78,556
Louisiana & Arkansas	Jan.	608	333,835	7,738	365,025	41,297	61,667	22,900	88,879	21,668	236,637	64.8	128,388	98,459	84,936	71,239
Louisiana, Arkansas & Texas	Jan.	255	71,622	284	77,069	14,209	8,349	3,870	29,268	4,114	59,810	77.6	17,259	14,752	1,417	—7,628
Louisville & Nashville	Jan.	5,069	5,052,983	392,822	5,907,932	629,796	1,067,071	182,388	2,015,574	272,737	4,201,808	71.1	1,706,124	1,362,882	1,409,943	850,494
Maine Central	Jan.	1,046	766,782	86,872	931,500	123,237	208,211	8,601	391,795	38,876	770,720	82.7	160,781	113,311	57,260	58,250
Midland Valley	Jan.	363	103,957	439	108,034	9,791	10,799	2,366	29,971	6,589	59,232	54.8	48,802	40,652	31,471	28,000
Minneapolis & St. Louis	Jan.	1,627	546,973	14,619	598,906	48,412	135,663	21,259	313,341	34,872	553,108	92.4	45,798	14,223	—2,491	—89,417
Minneapolis, St. Paul & S. S. Marie	Jan.	4,304	1,326,624	72,444	1,538,574	202,344	383,049	58,971	760,868	105,462	1,512,474	98.3	26,100	—124,798	—230,535	—395,635
Duluth, South Shore & Atlantic	Jan.	559	108,701	6,738	127,615	21,761	37,460	4,575	71,276	5,895	140,575	110.2	—12,960	—31,191	—43,081	—29,730
Spokane International	Jan.	163	27,826	1,475	33,712	6,366	4,404	1,629	19,155	4,330	35,884	106.4	—2,172	—6,173	—8,909	—18,382
Mississippi Central	Jan.	150	42,929	1,090	46,054	9,157	8,961	6,434	15,621	5,251	45,424	98.6	630	—2,181	—4,233	—7,566
Missouri & North Arkansas	Jan.	364	76,434	1,150	83,338	19,218	11,928	3,884	32,439	2,622	70,091	84.1	13,247	11,227	1,162	—19,770
Missouri-Illinois	Jan.	213	70,606	354	72,830	12,806	10,095	2,620	24,359	5,344	55,221	75.8	17,609	12,734	7,131	—3,267
Missouri-Kansas-Texas Lines	Jan.	3,293	1,768,079	153,023	2,131,484	267,578	379,063	117,249	801,349	141,711	1,722,433	80.8	409,051	234,238	37,014	—131,272
Missouri Pacific	Jan.	7,361	4,915,990	307,722	5,710,118	600,980	1,171,060	224,266	2,137,285	254,544	4,405,913	77.2	1,304,205	965,434	557,204	321,098
Gulf Coast Lines	Jan.	1,765	811,676	30,683	890,743	98,845	139,471	42,100	243,635	47,218	569,874	63.98	320,869	272,540	182,207	127,238
International-Great Northern	Jan.	1,159	786,002	42,414	907,881	115,301	146,500	28,362	360,820	42,402	701,131	77.23	206,750	171,704	55,143	61,745
San Antonio, Uvalde & Gulf	Jan.	316	88,485	3,420	98,156	13,834	10,495	4,231	29,149	4,378	62,002	63.2	36,154	32,490	10,531	—11,440
Mobile & Ohio	Jan.	1,201	644,762	21,340	701,972	98,586	154,036	40,567	262,113	36,099	591,381	84.2	110,591	79,945	5,481	—95,988
Monongahela	Jan.	177	340,499	949	343,921	32,031	30,011	382	72,747	4,045	139,216	40.5	204,705	186,602	95,074	62,395
Monongahela Connecting	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
Montour	Jan.	57	98,924	.....	99,681	8,939	45,722	1,063	27,354	5,462	88,540	88.8	11,141	7,416	23,324	54,160
Nashville, Chattanooga & St. Louis	Jan.	1,203	899,041	71,858	1,109,591	131,463	208,834	58,875	415,770	57,921	881,445	79.4	228,146	188,447	159,904	73,689
Nevada Northern	Jan.	165	18,708	1,283	23,761	8,658	2,732	664	7,271	3,497	22,822	96.1	939	—5,340	—1,208	—6,978
Newburgh & South Shore	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
New Orleans Terminal	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
New York Central	Jan.	11,414	17,076,751	4,423,061	24,284,542	2,182,930	4,933,657	493,235	9,222,510	1,012,415	18,217,502	75.0	6,067,040	3,676,457	2,454,237	1,504,143

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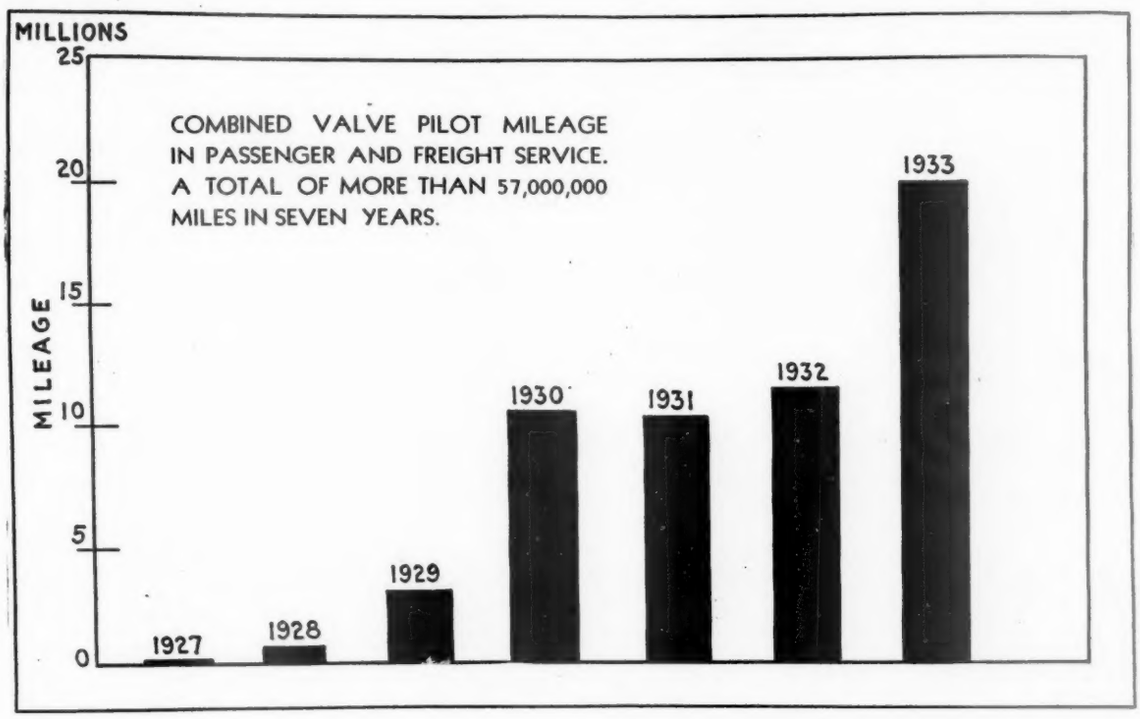
20 MILLION MILES

of Valve Pilot Locomotive Operation

in 1933



Nearly Doubled 1932 Mileage

and increased more than 2000 times the mileage of 1927

Growth in the service mileage of any device is the best evidence of its value and utility.

VALVE PILOT CORPORATION

230 Park Avenue, New York City

Revenues and Expenses of Railways

MONTH OF JANUARY OF CALENDAR YEAR 1934—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of—Way and structures	Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net ry. operating income, 1933
Indiana Harbor Belt	Jan.	120	.....	.....	$630,057	$44,027	$68,321	$3,277	$274,330	$16,628	$422,662	67.1	$207,395	$158,079	$112,299	$127,991
Pittsburgh & Lake Erie	Jan.	233	$1,013,355	$48,979	1,101,216	77,920	392,798	25,680	416,577	71,978	985,050	89.5	116,166	28,957	182,264	140,603
New York, Chicago & St. Louis	Jan.	1,691	2,580,634	57,359	2,734,058	186,713	415,518	97,932	955,180	130,730	1,786,249	65.3	947,809	795,956	518,379	132,841
New York, New Haven & Hartford	Jan.	2,067	3,444,660	1,874,548	5,998,697	581,887	1,022,720	68,290	2,331,943	232,512	4,368,748	72.8	1,629,949	1,279,147	724,221	361,203
New York Connecting	Jan.	20	246,976	.....	254,054	3,572	6,841	.....	28,624	959	39,996	15.7	214,058	180,233	150,517	114,239
New York, Ontario & Western	Jan.	568	839,431	7,464	923,321	72,165	149,572	8,992	392,150	26,810	655,222	71.0	268,099	223,062	169,378	151,912
Norfolk & Western	Jan.	2,185	5,352,066	119,234	5,660,725	592,054	1,306,589	114,833	1,336,213	200,130	3,562,455	62.9	2,098,270	1,403,576	1,474,732	1,594,711
Norfolk Southern	Jan.	932	309,779	9,281	338,782	66,354	49,222	16,570	133,220	22,316	287,682	84.9	51,100	24,909	5,857	—98,910
Northern Pacific	Jan.	6,745	2,838,789	218,317	3,402,528	265,180	822,028	133,232	1,576,004	267,158	3,117,745	91.6	284,783	—184,551	129,392	—432,379
Northwestern Pacific	Jan.	383	112,577	69,477	214,135	35,237	45,805	3,986	127,186	13,346	225,497	105.3	—11,362	—28,456	—36,647	—87,044
Oklahoma City-Ada-Atoka	Jan.	132	28,078	386	30,124	4,719	1,176	766	10,872	1,285	18,818	62.5	11,306	8,123	999	349
Pennsylvania Railroad	Jan.	10,511	19,651,769	4,901,096	27,221,778	2,169,032	5,518,328	533,142	10,216,714	1,333,926	20,128,023	73.9	7,093,755	5,472,736	4,667,321	3,517,359
Long Island	Jan.	400	492,075	1,283,917	1,877,623	138,483	286,954	13,746	892,819	55,505	1,387,455	73.9	490,168	386,061	231,505	305,690
Peoria & Pekin Union	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
Pere Marquette	Jan.	2,252	1,906,930	55,426	2,054,013	208,022	442,630	57,200	777,841	88,778	1,577,559	76.8	476,454	365,501	207,912	—37,515
Pittsburg & Shawmut	Jan.	102	59,870	730	61,229	8,667	18,809	1,240	18,623	3,883	51,222	83.7	10,007	9,542	15,760	334
Pittsburgh & West Virginia	Jan.	138	181,908	.....	191,204	15,989	43,588	12,378	41,648	13,730	134,538	70.4	56,666	33,763	59,158	22,026
Pittsburg, Shawmut & Northern	Jan.	195	84,288	194	90,018	12,694	22,077	1,290	31,702	6,477	74,240	82.5	15,778	13,547	6,668	3,172
Reading	Jan.	1,461	4,521,113	252,049	4,985,098	278,808	812,759	76,624	1,736,938	191,125	3,111,462	62.4	1,873,636	1,452,668	1,426,700	652,008
Pennsylvania-Reading Seashore Lines	Jan.	412	255,388	119,008	397,266	34,206	64,714	5,935	303,585	26,370	435,566	109.6	—38,300	—112,479	—194,089	—81,261
Richmond, Fredericksburg & Potomac	Jan.	117	278,647	156,132	543,182	42,560	115,069	8,713	217,915	29,600	422,082	77.7	121,100	92,438	47,003	65,705
Rutland	Jan.	413	171,541	41,566	270,286	56,056	63,147	9,659	142,177	15,659	286,698	106.1	—16,412	—36,532	—29,601	—13,119
St. Louis-San Francisco	Jan.	5,240	2,931,334	191,929	3,395,847	484,829	739,445	103,132	1,200,125	145,232	2,671,923	78.7	723,924	462,339	408,284	15,792
Fort Worth & Rio Grande	Jan.	233	30,740	1,027	37,854	14,897	9,814	2,184	20,822	3,750	51,467	136.1	—13,613	—17,158	—22,719	—35,517
St. Louis, San Francisco & Texas	Jan.	261	70,447	350	73,838	25,299	15,330	4,472	34,863	7,556	87,337	118.3	—13,499	—17,406	—43,812	—45,641
St. Louis Southwestern Lines	Jan.	1,884	1,021,198	15,215	1,091,792	114,397	168,939	68,917	402,573	57,676	817,814	74.9	273,978	196,320	83,640	53,330
San Diego & Arizona Eastern	Jan.	155	36,953	6,751	45,265	7,028	8,510	1,847	17,864	4,163	40,007	88.4	5,258	3,396	4,688	—8,230
Seaboard Air Line	Jan.	4,310	2,578,023	355,889	3,253,399	482,537	595,195	133,741	1,083,420	129,551	2,470,662	75.9	782,737	540,658	374,940	197,835
Southern Railway	Jan.	6,644	5,278,886	617,977	6,461,948	889,033	1,155,933	145,875	2,366,341	244,662	4,840,854	74.9	1,621,094	1,151,943	969,576	801,949
Alabama Great Southern	Jan.	315	326,764	33,499	395,368	72,987	75,316	11,986	132,470	14,258	309,062	78.2	86,306	56,334	64,834	—41,135
Cinn., New Orleans & Texas Pacific	Jan.	336	836,410	65,920	955,979	118,048	187,950	23,617	260,952	34,843	629,662	65.9	326,317	259,353	221,437	200,380
Georgia Southern & Florida	Jan.	397	103,473	27,137	149,049	27,944	39,656	1,580	66,534	2,107	139,925	93.9	9,124	—4,021	2,659	16,711
New Orleans & Northeastern	Jan.	204	152,305	15,516	181,088	24,240	35,656	6,431	71,239	8,721	147,672	81.5	33,416	10,741	—9,515	—62,616
Northern Alabama	Jan.	99	47,646	1,567	50,837	9,849	1,511	1,247	14,832	1,733	28,776	56.6	22,061	18,895	10,618	—1,039
Southern Pacific	Jan.	8,934	5,873,492	1,171,244	7,782,950	966,502	1,610,821	246,530	3,011,072	518,227	6,519,475	83.8	1,263,475	421,726	124,858	—766,849
Southern Pacific Steamship Lines	Jan.	...	268,628	4,847	285,841	14,285	109,833	16,507	235,810	19,750	396,185	138.6	—110,344	—111,350	—111,404	—107,068
Texas & New Orleans	Jan.	4,478	1,931,632	177,019	2,414,181	405,182	518,387	110,790	885,577	204,598	2,136,438	88.5	277,743	53,135	—148,621	—242,355
Spokane, Portland & Seattle	Jan.	552	269,055	25,490	338,753	37,712	45,184	5,897	141,239	15,780	247,394	73.0	91,359	33,559	17,247	—56,986
Tennessee Central	Jan.	287	173,517	4,205	187,245	26,926	23,309	5,005	62,291	10,549	127,896	68.3	59,349	55,138	36,851	29,553
Terminal Railroad Assn. of St. Louis	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
Texas & Pacific	Jan.	1,950	1,364,122	141,385	1,703,553	174,820	281,764	63,765	529,153	111,699	1,173,828	68.9	529,725	429,032	325,663	148,917
Texas Mexican	Jan.	162	56,031	606	62,284	7,941	11,887	3,362	26,697	6,686	56,385	90.5	5,899	1,347	—2,317	582
Toledo, Peoria & Western	Jan.	239	134,507	11	136,452	39,509	9,064	14,496	38,739	7,671	109,479	80.2	26,973	23,931	10,263	8,426
Toledo Terminal	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
Union Railroad of Pennsylvania	Jan.					Switching and Terminal Company—Will not file beginning January, 1934.										
Union Pacific	Jan.	3,767	4,264,489	320,641	4,978,959	282,790	1,204,462	109,752	1,580,782	262,924	3,498,489	70.3	1,480,470	1,027,902	790,008	399,953
Oregon Short Line	Jan.	2,504	1,443,865	78,600	1,672,658	140,891	286,820	30,285	556,057	88,615	1,164,320	69.6	508,338	281,678	180,767	18,491
Oregon-Washington R. R. & Nav. Co.	Jan.	2,295	1,007,716	74,446	1,189,688	283,195	172,791	49,714	459,373	85,569	1,055,738	88.7	133,950	—340	—108,840	—288,241
Los Angeles & Salt Lake	Jan.	1,241	1,039,698	84,770	1,216,958	177,050	207,597	44,779	388,980	54,487	897,826	73.8	319,132	198,471	73,149	46,498
St. Joseph & Grand Island	Jan.	258	251,389	1,377	260,346	14,576	25,296	2,123	70,106	11,719	124,111	47.7	136,235	116,664	80,696	26,647
Utah	Jan.	111	81,890	.....	82,220	7,857	20,415	464	18,343	5,493	52,572	63.9	29,648	18,721	11,264	32,775
Virginian	Jan.	619	1,178,474	4,818	1,236,932	100,979	211,591	16,799	215,875	24,354	569,509	46.0	667,423	527,423	588,851	536,452
Wabash	Jan.	2,457	2,562,453	152,088	2,912,106	304,458	498,477	133,445	1,183,050	129,402	2,254,512	77.4	657,594	523,189	163,901	—229,466
Ann Arbor	Jan.	293	238,049	2,521	246,931	22,956	46,419	10,515	118,902	10,290	209,125	84.7	37,806	21,486	7,810	—21,111
Western Maryland	Jan.	891	1,118,654	5,853	1,154,897	115,697	260,037	32,220	301,443	38,717	746,735	64.7	408,162	338,162	352,918	273,051
Western Pacific	Jan.	1,213	772,401	9,914	815,727	111,142	150,579	50,566	316,129	36,244	680,564	83.4	135,163	65,711	38,045	—105,243
Wheeling & Lake Erie	Jan.	511	803,649	1,700	851,540	63,716	238,019	27,221	261,176	27,664	617,621	72.5	233,919	149,479	136,279	50,252
Wichita Falls & Southern	Jan.	203	40,786	46	46,567	10,180	6,586	1,697	14,006	3,554	36,023	77.36	10,544	7,657	3,761	1,024